



United States
Department of
Agriculture



NRCS

Natural
Resources
Conservation
Service

In cooperation with
the University of
Puerto Rico,
Agricultural Experiment
Station; the United
States Fish and Wildlife
Service; the Puerto
Rico Cooperative
Extension Service;
and the Suroeste Soil
Conservation District

Soil Survey of San Germán Area, Puerto Rico



How To Use This Soil Survey

General Soil Maps

The general soil map, which is a color map, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

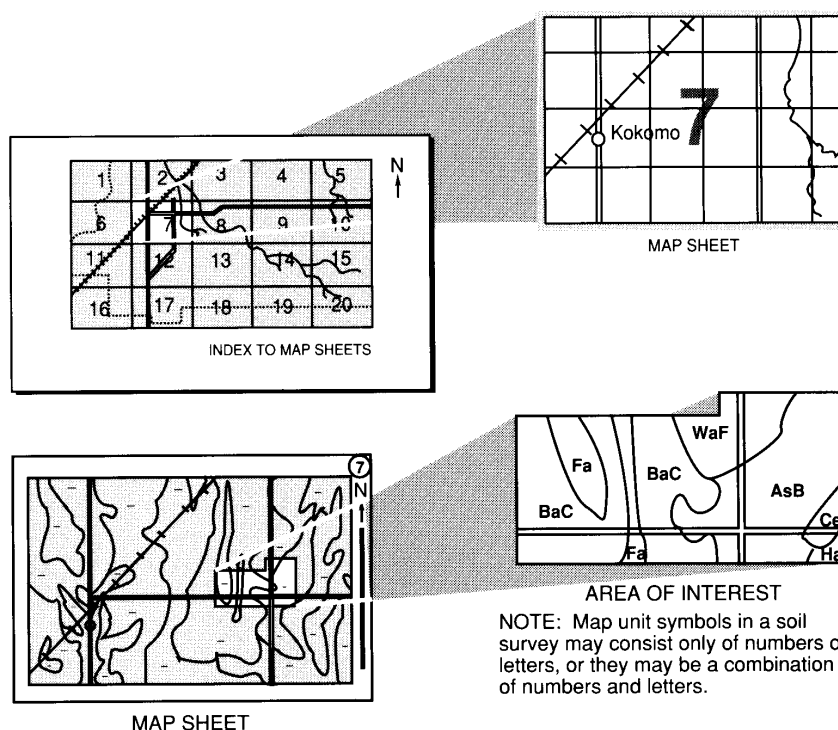
Detailed Soil Maps

The detailed soil maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**. Note the number of the map sheet and turn to that sheet.

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Contents**, which lists the map units by symbol and name and shows the page where each map unit is described.

The **Contents** shows which table has data on a specific land use for each detailed soil map unit. Also see the **Contents** for sections of this publication that may address your specific needs.



National Cooperative Soil Survey

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey. This survey was made cooperatively by the Natural Resources Conservation Service and the University of Puerto Rico, Agricultural Experiment Station; the United States Fish and Wildlife Service; the Puerto Rico Cooperative Extension Service; and the Suroeste Soil Conservation District. The survey is part of the technical assistance furnished to the Suroeste Soil Conservation District.

Major fieldwork for this soil survey was completed in 2003. Soil names and descriptions were approved in 2007. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 2007. The most current official data are available at <http://websoilsurvey.nrcs.usda.gov/app/>.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

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Cover Captions

Upper left: Humid Coastal Plains Major Land Resource Area.

Upper right: Semiarid Coastal Plains Major Land Resource Area.

Lower left: Semiarid Mountains and Valleys Major Land Resource Area.

Lower right: Humid Mountains and Valleys Major Land Resource Area.

Additional information about the Nation's natural resources is available online from the Natural Resources Conservation Service at <http://www.nrcs.usda.gov>.

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Foreword

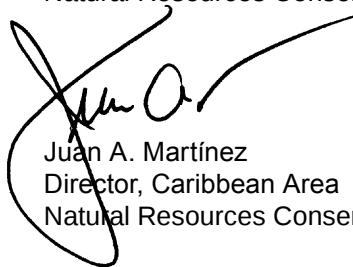
Soil surveys contain information that affects land use planning in survey areas. They include predictions of soil behavior for selected land uses. The surveys highlight soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

Soil surveys are designed for many different users. Farmers, ranchers, foresters, and agronomists can use the surveys to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the surveys to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the surveys to help them understand, protect, and enhance the environment.

Various land use regulations of Federal and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. The location of each map unit is shown on the detailed soil maps. Each soil in the survey area is described, and information on specific uses is given. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.



Juan A. Martínez
Director, Caribbean Area
Natural Resources Conservation Service

Soil Survey of San Germán Area, Puerto Rico

By Jorge L. Lugo-Camacho, Natural Resources Conservation Service

Fieldwork by Jorge L. Lugo-Camacho, Samuel Ríos-Tirado, and
Milton Cortés-Colón, Natural Resources Conservation Service

United States Department of Agriculture,
Natural Resources Conservation Service,
in cooperation with
the University of Puerto Rico, Agricultural Experiment Station;
the United States Fish and Wildlife Service;
the Puerto Rico Cooperative Extension Service;
and the Suroeste Soil Conservation District

This soil survey updates the survey of Lajas Valley Area published in 1965 (Carter and others, 1965). It provides additional information and has larger maps, which show the soils in greater detail. The location of the survey area is shown in figure 1.

General Nature of the Survey Area

This section provides general information about the climate and geology of the survey area.

Climate

By Hilton Miró, hydrology engineer, and Jorge L. Lugo-Camacho, soil survey project leader, Natural Resources Conservation Service

The total annual precipitation in San Germán is about 57 inches. Of this, 35 inches, or 61 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through

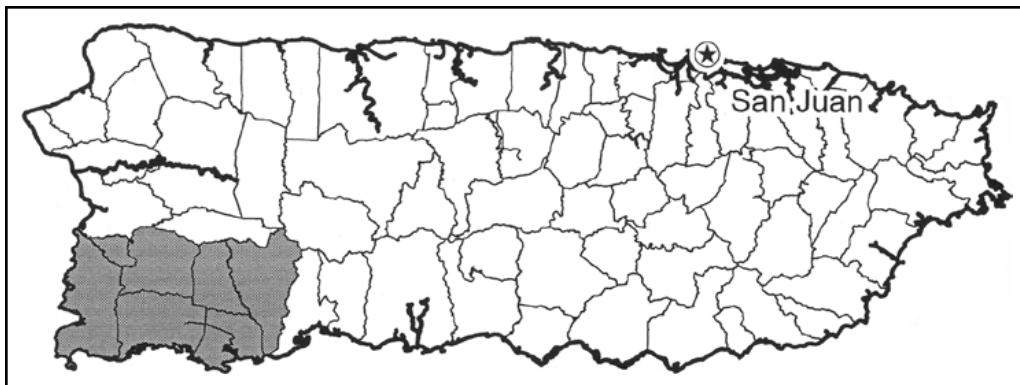


Figure 1.—Location of the survey area in Puerto Rico.

September is less than 10 inches. The heaviest 1-day rainfall during the period of record was 6.70 inches on April 27, 1954.

In winter, the average temperature in San Germán is 74.4 degrees F and the average daily minimum temperature is 61.1 degrees F. The lowest temperature on record, which occurred in April, 1950, is 49 degrees F. In summer, the average temperature is 79.6 degrees F and the average daily maximum temperature is 91.4 degrees F. The highest recorded temperature, which occurred in July 1949, is 98 degrees F.

Rainfall

The soil survey area is in the southwestern part of Puerto Rico. The southern part of the survey area is comprised of the Lajas Valley. The north-northeast part of the survey area includes the southern slopes of the Central Mountain Range. The mountainous region includes the northern parts of the municipalities of San Germán, Sabana Grande, and Yauco. The northeastern part of San Germán and the northern part of Sabana Grande comprise one of the three areas of heaviest rainfall on the island. The Lajas Valley and the south coast, where the Guánica State Forest is located, comprise the driest region on the island. The Guánica State Forest is a subtropical dry forest. The rainfall in the survey area generally is heavier during May and from August to November and is lighter from December through March.

The average annual rainfall as recorded at five NOAA weather stations is listed in table 1. The NOAA stations are at Lajas, Magueyes Island, Ensenada, Maricao, and Central San Francisco. Additional data from NOAA weather stations is listed in table 2. The average annual rainfall was 45.01 inches at the Lajas substation, which is at the Agricultural Experiment Station of the University of Puerto Rico. This station is representative of the ustic soil moisture regime. The stations at Magueyes Island, Ensenada, and Central San Francisco are closer to the south shore of the island. They have average annual rainfalls of 30.23, 31.47, and 30.28 inches, respectively, and are in an aridic soil moisture regime. The highest average annual rainfall in the survey area is along the northern boundaries of the municipalities of San Germán and Sabana Grande. The annual average precipitation at the Maricao station was 95.60 inches. This station is close to the north boundary of the survey area and is in an area with a perudic soil moisture regime (Lugo-Camacho, 2005).

Data regarding precipitation and soil moisture were also collected from four weather stations in the Soil Climate Analysis Network (SCAN). The SCAN stations are at Guánica State Forest, Combate, Guilarte State Forest, and Maricao State Forest. Some of the data from these stations is summarized in table 3. The stations range in elevation from sea level to 3,343 feet and are in areas with different soil temperature regimes. The mean annual precipitation at Guánica State Forest was 30.34 inches for a 6-year period. The lowest average rainfall was 24.61 inches in the Combate area at Cabo Rojo. This area is recognized as having an aridic soil moisture regime. The highest average rainfall was measured at the Guilarte State Forest, which is in the northern part of the survey area. This station is in an area with a perudic soil moisture regime. The mean annual precipitation at the Maricao State Forest station, which is in the udic soil moisture regime, was 72.14 inches (Lugo-Camacho, 2005; Lugo-Camacho and others, 2007). Note that the Maricao State Forest station in the Soil Climate Analysis Network is considerably farther south than the Maricao station of the National Oceanic and Atmospheric Administration.

Temperature

The temperatures in the survey area are subject to very little seasonal variation. Mean summer temperatures differ from mean winter temperatures by less than 6 degrees C. The highest temperatures are observed from May to November.

Soil Survey of San Germán Area, Puerto Rico

During winter at the NOAA Lajas substation, the average monthly air temperature is about 74.1 degrees F, the average minimum temperature is 61.3 degrees F, and the average maximum temperature is 86.8 degrees F. During summer, the average monthly temperature is about 80 degrees F, the average minimum temperature is 68.9 degrees F, and the average maximum temperature is 91.1 degrees F.

Data regarding air and soil temperature were collected from the four weather stations in the Soil Climate Analysis Network (SCAN) for a 6 year period.

The mean annual air temperature is 78.1 degrees F at Guánica State Forest and 78.8 degrees F in the Combate area (fig. 2 and 3). At Guánica State Forest, the mean annual soil temperature is 82.0 degrees F, the mean minimum soil temperature is 72.3 degrees F, and the mean maximum soil temperature is 87.6 degrees F. In the Combate area, the mean annual soil temperature is 82.6 degrees F, the mean minimum soil temperature is 70.3 degrees F, and the mean maximum soil temperature is 87.6 degrees F. The difference between the mean summer soil temperature and mean winter soil temperature is 4.2 degrees F at a depth of 12 inches at the Guánica station and 6.1 degrees F at a depth of 20 inches depth at the Combate station. The temperatures are representative of an isohyperthermic soil temperature regime (Lugo-Camacho and others, 2007).

During winter in the mountainous region at the Maricao State Forest station, the average monthly temperature is about 69.3 °F, the average minimum temperature is 61.2 °F, and the average maximum temperature is 77.4 °F. During summer, the average monthly temperature is about 74 °F, the average minimum temperature is 66.3 °F, and the average maximum temperature is 81.6 °F.

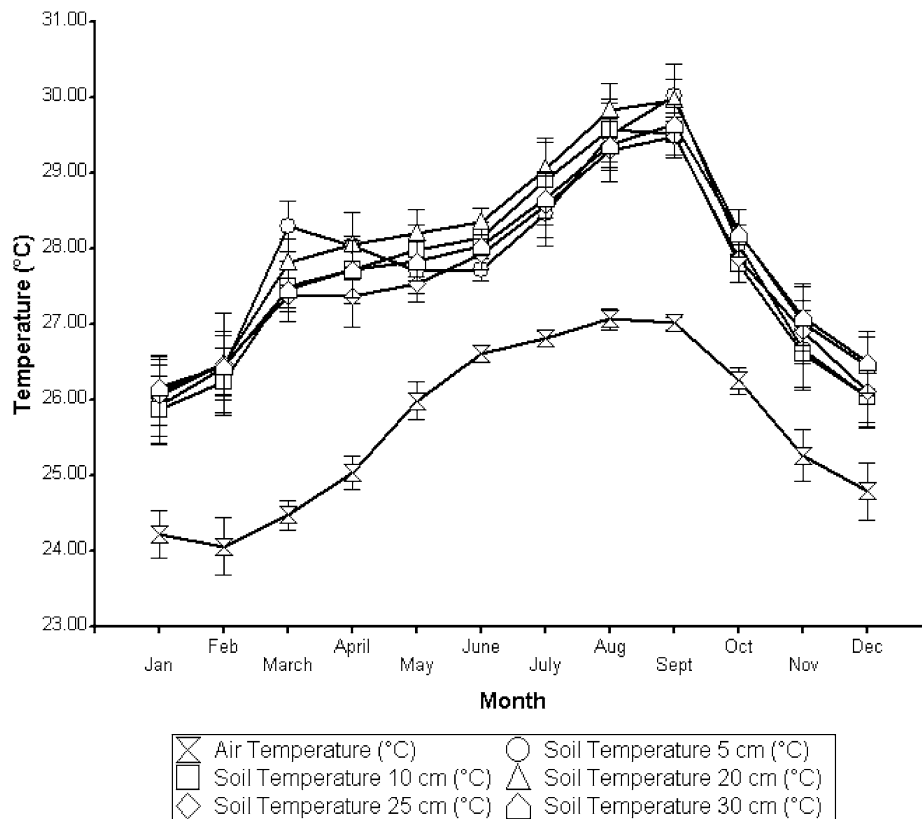


Figure 2.—Air and soil temperature data at varying depths as recorded by the SCAN weather station at Guánica State Forest from 2001 to 2007.

Soil Survey of San Germán Area, Puerto Rico

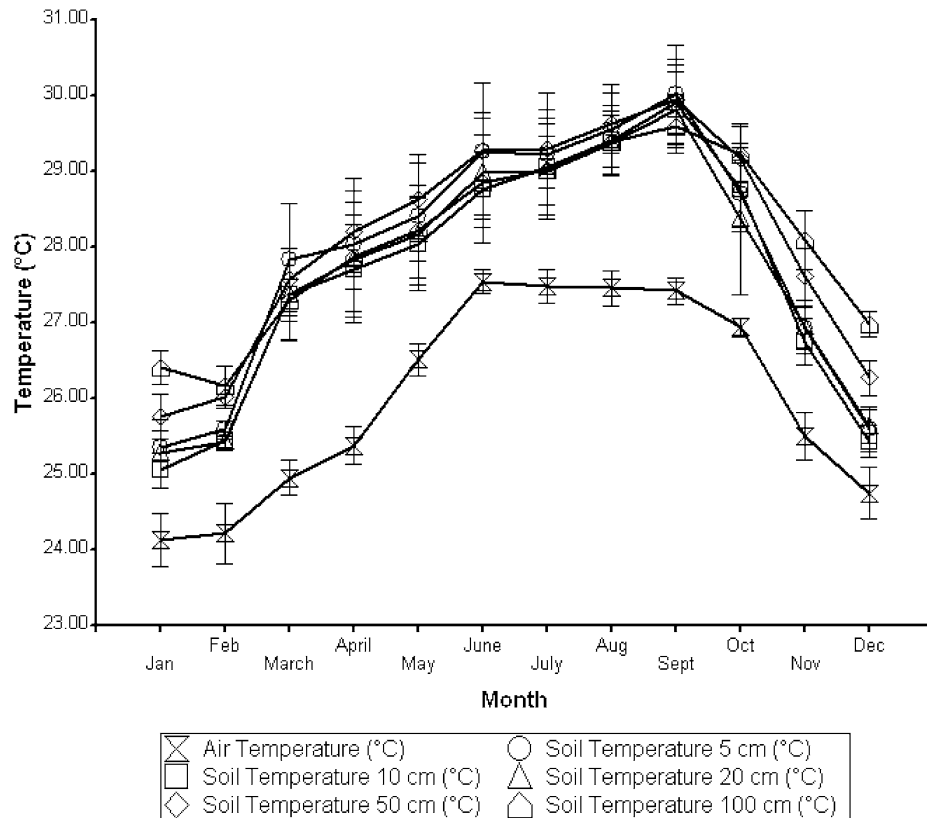


Figure 3.—Air and soil temperature data at varying depths as recorded by the SCAN weather station at Combate from 2001 to 2007.

The mean annual air temperature is 70 degrees F at the Maricao State Forest station and 66.2 degrees F at the Guilarte State Forest station (fig. 4 and 5). The mean annual soil temperature is 71.4 degrees F at Maricao State Forest and 70.0 degrees F at Guilarte State Forest. The difference between the mean summer and mean winter soil temperatures at a depth of 20 inches is 2.2 degrees F at Maricao State Forest and 3.9 degrees F at Guilarte State Forest. The temperatures are representative of an isothermic soil temperature regime (Lugo-Camacho and others, 2007).

Data from the Guánica, Combate, and Maricao Stations in the survey area and the Guilarte and Isabela Stations outside the survey area indicate that the mean annual soil temperature in Puerto Rico can be estimated by adding 3.2 degrees F to the mean annual air temperature or by using the equation $y = -0.004x + 82.4$ degrees F where x is the elevation in feet ($y = -0.007x + 28.0$ degrees C; x in meters). The equation indicates that 97 percent of the time the behavior of the mean annual soil temperature is a function of the elevation (fig. 6) (Lugo-Camacho and others, 2008).

Geology

By Fred H. Beinroth, professor of soil science, Department of Agronomy and Soils, University of Puerto Rico-Mayagüez

The geology of the Suroeste Soil Conservation District is very complex. An in-depth discussion is not feasible in the context of this report, and only a general account is presented. Those seeking additional information are referred to the comprehensive compendium covering all aspects of the geology of the island that was compiled and edited by W. Bawiec (2001) and published on CD by the U.S. Geological Survey. An earlier account by the author (Beinroth, 1969) also provides general information.

Soil Survey of San Germán Area, Puerto Rico

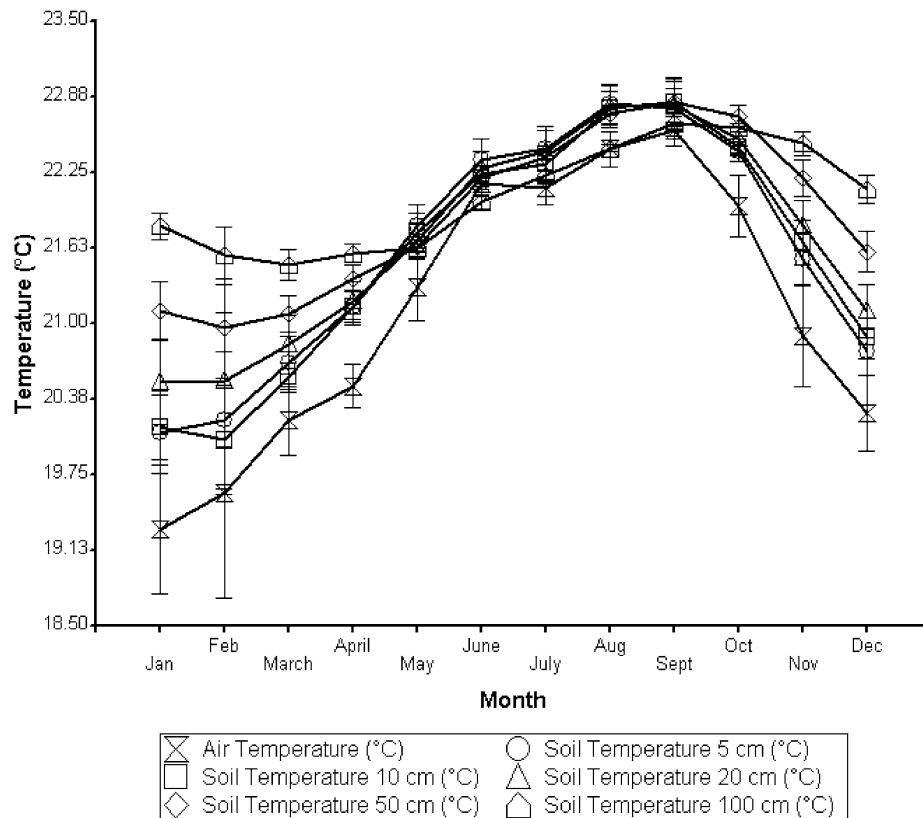


Figure 4.—Air and soil temperature data at varying depths as recorded by the SCAN weather station at Maricao State Forest from 2001 to 2007.

Geologic maps at a scale of 1:20,000 with detailed explanatory text of interest regarding the survey area have been published by the U.S. Geological Survey for the quadrangles of Cabo Rojo and Parguera (Volkman, 1984a), Maricao (McIntyre, 1975), Mayagüez and Rosario (Curet, 1986), Puerto Real (Volkman, 1984b), and San Germán (Volkman, 1984c).

Tectonic Setting

The island of Puerto Rico is located at the northern margin of a microplate in the tension zone between the North American plate and the Caribbean plate. The latter originated about 90 million years ago in the Pacific basin as a plateau of oceanic crust of Jurassic and Cretaceous age known as the Caribbean Cretaceous Basalt Province. The Caribbean plate subsequently moved eastward into the widening gap between North and South America. By about 75 million years ago, the gap had become the Atlantic Ocean. The younger and more buoyant Caribbean plate overrode the older North American and South American plates but subducted into the Muertos trough under the sliver of oceanic crust that forms the Puerto Rico-Virgin Islands block. This block collided with the Bahamas banks during the mid-Santonian age (about 85 million years ago) and then rotated counterclockwise to its present east-west orientation (Jolly and others, 1998). Although various models for the formation of the Caribbean are currently under consideration, a consensus has yet to emerge.

The island has been subdivided into northeast, central, and southwest structural-stratigraphic blocks on the basis of the perceived presence of major fault zones. A southwest Puerto Rico fault zone that was conjectured to separate the southwest and central blocks was placed at various locations, but its presence and function in the separation of the lithologically different blocks was not demonstrated. The presence

Soil Survey of San Germán Area, Puerto Rico

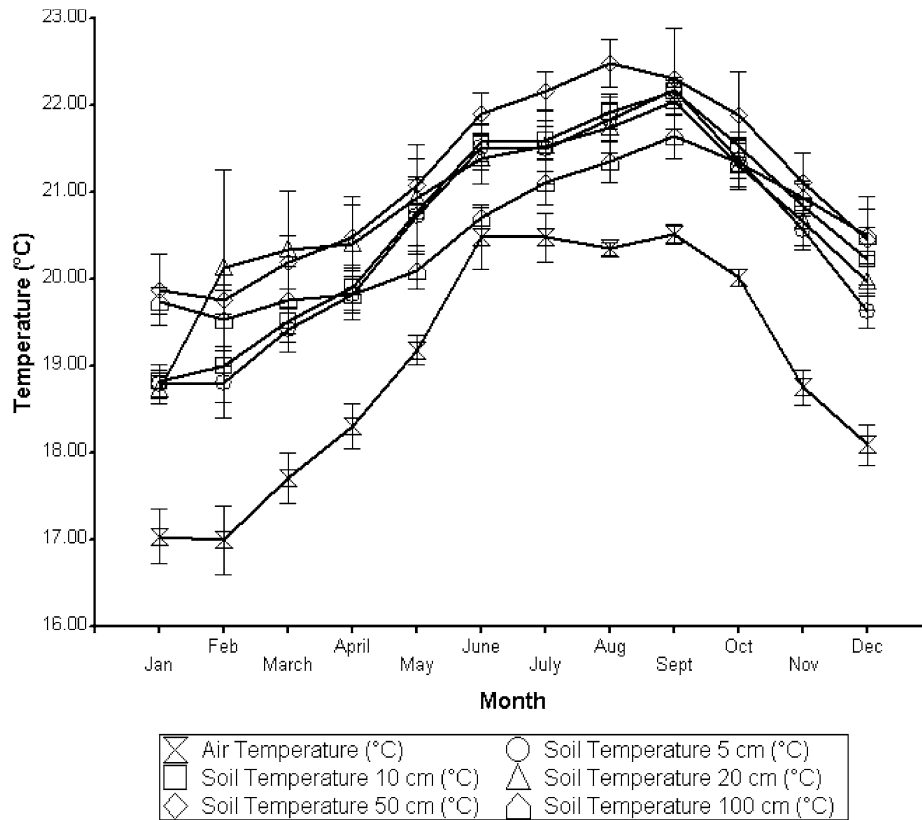


Figure 5.—Air and soil temperature data at varying depths as recorded by the SCAN weather station at Guilarte State Forest from 2001 to 2007.

of oceanic plate rocks in the southwestern part of the island appears to support the existence of a southwestern block, but widespread cover by younger rocks precludes the delineation of the block (Krushensky and Schellekens, 2001).

Stratigraphy

The oldest rocks in Puerto Rico, the Bermeja Complex, occur mostly in the survey area. The Bermeja Complex consists primarily of metamorphic rocks (serpentinite and greenstone), ultrabasic igneous rocks (amphibolite and basalt), and sedimentary rock (chert). The oldest of these rocks are of Late Jurassic age (about 150 million years ago).

Mainly marine volcanoclastic rocks of Upper Cretaceous age (95 to 75 million years) unconformably overlie much of the Bermeja Complex. These rocks include volcanic sandstone, siltstone, and claystone and breccia, lava, and tuff. The Yauco Formation consists primarily of these rocks, which are, in places, hydrothermally altered. There are also occurrences of basalt and andesite as well as the massive limestones of the Peñones, Melones, and Parguera Formations that originated in the Late Cretaceous.

There is an unconformity between the Cretaceous and the mid-Tertiary (Oligocene, 25 million years ago), when quartz-diorite, granodiorite, diorite, gabbro, tuff, and breccia were formed. The Ponce limestone also originated in this period (Miocene to Oligocene).

The Quaternary, which began about 1.6 million years ago, is represented by alluvial and colluvial deposits of sand, silt, clay, and gravel. There are also small deposits of nearly pure quartz sand whose origin is unknown as there is no apparent source. Note that these sands don't share the characteristics of the blanket sands of the north coast.

Soil Survey of San Germán Area, Puerto Rico

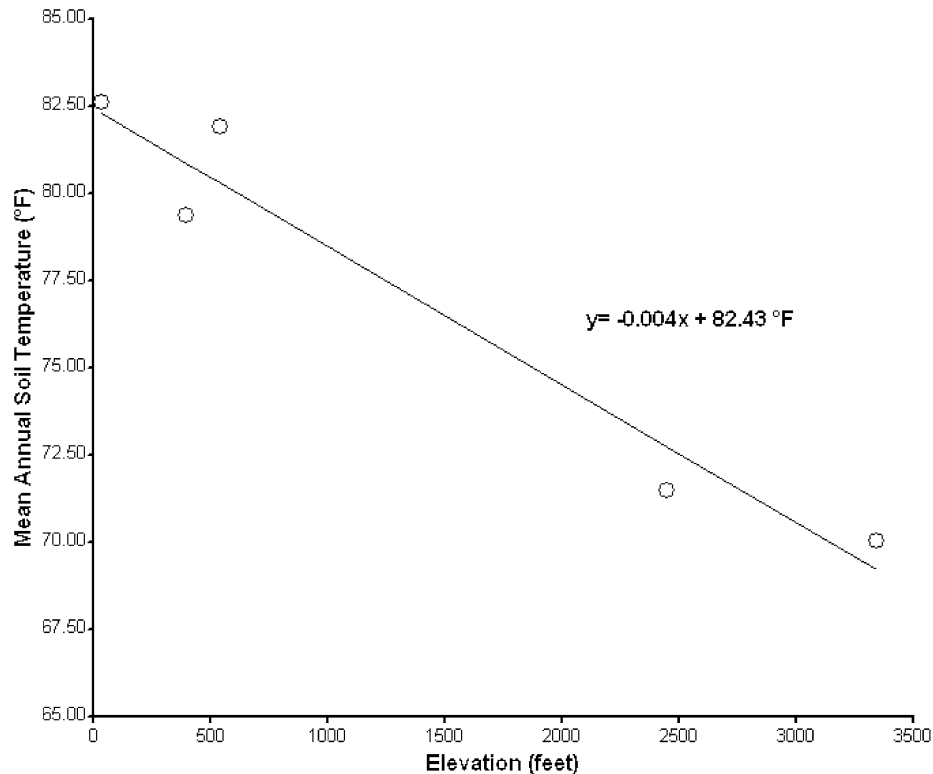


Figure 6.—Relationship between elevation above sea level and mean annual soil temperature at a depth of 20 inches in Puerto Rico.

Distribution of the Rocks

Three areas of distinct geology dominate the soil survey area: Quaternary alluvials, Cretaceous volcanics, and Jurassic rocks of the Bermeja Complex. The most extensive geologic formations in the survey area are the unconsolidated alluvial sediments of Quaternary age. Large areas of these sediments occupy the Lajas Valley in the south and the Guanajibo Valley in the northwestern part of the survey area.

Equally extensive are the Upper Cretaceous rocks that occur throughout the area. They consist primarily of volcanics, such as the Yauco Formation, but also include smaller outcrops of andesite, basalt, and limestone of the Peñones, Melones, and Parguera Formations.

The northeast part of the survey area is dominated by Jurassic serpentinite. Smaller areas of this rock also occur south of Mayagüez and in the Sierra Bermeja, most of which is, however, composed of Mariquita Chert.

Tertiary igneous and volcanic rocks are of minor extent, but the Ponce Limestone is a prominent feature along the south coast in the survey area.

Geomorphology

The survey area exhibits a wide variety of landforms of different age. These include the coastal ecosystems of tidal flats, mangrove swamps, alluvial fans, and beach deposits. Farther inland are the flood plains and terraces of the Río Guanajibo and other rivers and streams. The extensive, flat Lajas Valley is an internally drained, elongated depression that parallels the south coast. An outlet into the Caribbean Sea was provided to reclaim the area for sugarcane production and drained most of the swampy areas; only the Laguna Cartagena remains. Hilly terrain prevails to the

north and south of the Lajas Valley. Although there are areas of Cretaceous (Melones, Parguera) and Tertiary (Ponce) limestone, they lack the karst features that are typical for the Tertiary limestones at the north coast of the island. The lack of karst features may be attributed to the scarcity of precipitation in the rainshadow of the Cordillera Central in which the Melones and Ponce Formations are located.

Mountainous topography dominates in the region north of Puerto Rico Highway 2 in the area of volcanic and serpentinite rocks. The uplands reach an altitude of nearly 900 meters and are strongly dissected. There are, however, small areas that have low gradients and flat surfaces among the steeply sloping terrain. These are interfluvies where older erosion surfaces are preserved. An example is the flat narrow ridge along Puerto Rico Highway 120 in the Monte del Estado at an elevation of about 890 meters. This surface is believed to be a correlative of the Miocene (about 15 million years ago) St. John Peneplain, which is more prominent in the eastern part of the island. Similar small surfaces occur at lower elevations and may correspond to the Caguana Peneplain of Pliocene age (about 6 million years ago).

Weathering Products

The process that generates the parent material for soil is basically controlled by the interaction of three factors: (1) the physical and chemical nature of the rock or substratum, (2) the geomorphic position in the landscape, and (3) the climatic conditions. The considerable diversity of these attributes in the survey area resulted in an equally diverse pattern of parent materials.

The ultrabasic metamorphic rocks of the Bermeja Complex (serpentinite, amphibolite, and greenstone) consist mainly of ferromagnesian silicates and contain very little or no quartz. In the humid and wet parts of the survey area, these rocks weather readily, producing an iron-rich, dusky red regolith of clayey texture. In geomorphologically stable landscape positions, weathering produces thick regoliths. For the most part, however, erosion restricts the development of regoliths on the steep and very steep slopes. In the subhumid and semiarid areas, the less intense weathering yields shallow soils.

The volcanoclastic rocks in the survey area vary in appearance, but they have essentially the same mineralogy because they are derived from the same pool of magma. They are andesitic or basaltic and therefore consist mainly of basic feldspars, such as plagioclase, with minor amounts of ferromagnesian minerals and quartz. They weather to form saprolite that, under conditions of free drainage, consists mainly of clay minerals of the 1:1 lattice type, such as kaolinite, oxides of iron and aluminum, and small amounts of quartz. The thickness of the saprolite is controlled by landscape position and climate.

The siliceous Mariquita Chert, which is the dominant rock of the Sierra Bermeja, is a very hard, dense sedimentary rock consisting chiefly of quartz. It is exceedingly resistant to weathering, resulting in a stony, acid parent material for soil. Low rainfall in the area further inhibits weathering.

The hard and massive Cretaceous limestones weather mainly chemically by dissolution of the carbonates, yielding a thin and stony regolith. The friable Ponce limestone in the semiarid area typically weathers to a shallow carbonatic regolith. In many places, however, it is capped by a hard and impermeable layer of secondary carbonates at shallow depth. This cap hampers weathering and results in shallow, gravelly soils.

The Quaternary sediments of the subhumid Lajas Valley are derived from andesitic and basaltic rocks and therefore contain bases, such as calcium and magnesium. Because these bases are not leached, they can recombine to form clay minerals of the 2:1 lattice type, such as montmorillonite and other clay minerals of the smectite group. These clays have a high swell-shrink potential and are the typical parent material of Vertisols.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil

Soil Survey of San Germán Area, Puerto Rico

scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

The descriptions, names, and delineations of the soils in this survey area do not fully agree with those of the soils in adjacent survey areas. Differences are the result of a better knowledge of soils, modifications in series concepts, or variations in the intensity of mapping or in the extent of the soils in the survey areas.

General Soil Map Units

The general soil map in this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. The components of one map unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soils of the Perudic Uplands

1. *Agüeybaná-Maricao-Rubias Association*

Very steep, well drained, moderately deep to very deep soils on volcanic mountainsides; in an extremely humid climate

Setting

Location in the survey area: Northern part, extends across the north part of San Germán, Sabana Grande, and Yauco municipalities at the Central Mountain Range

Landscape: Mountain ranges

Landform: Ridges and mountain slopes

Slope: 20 to 90 percent

Composition

Percent of the survey area: 5.9 percent

Agüeybaná soils: 40 percent

Maricao soils: 35 percent

Rubias soils: 10 percent

Minor components: Chiquito soils—5 percent, Cuchillas soils—5 percent, and volcanic rock outcrop—5 percent

Soil Characteristics

Agüeybaná

Surface layer:

0 to 14 inches—strong brown clay

Subsoil:

14 to 44 inches—red clay

44 to 57 inches—red silty clay

Substratum:

57 to 80 inches—mottled red, reddish brown, yellowish red, yellow, and dark brown clay

Depth class: Very deep

Drainage class: Well drained

Slope: 20 to 60 percent

Parent material: Residuum that weathered from basalt

Maricao

Surface layer:

0 to 5 inches—dark brown clay

Subsurface layer:

5 to 11 inches—dark reddish brown clay

Subsoil:

11 to 29 inches—dark reddish brown clay

29 to 35 inches—red clay that has iron-manganese concretions and saprolite materials

35 to 46 inches—red silty clay loam that has iron-manganese concretions and saprolite materials

Substratum:

46 to 65 inches—mottled red, reddish brown, yellowish brown, and brownish yellow clay loam that has iron-manganese concretions

Depth class: Very deep

Drainage class: Well drained

Slope: 20 to 60 percent

Parent material: Residuum that weathered from basalt

Rubias

Surface layer:

0 to 8 inches—very dark grayish brown clay loam

Subsoil:

8 to 18 inches—very dark grayish brown clay loam

Substratum:

18 to 25 inches—brown loam

Bedrock layer:

25 to 50 inches—moderately weathered, unconsolidated mudstone

50 to 80 inches—hard, fractured, consolidated mudstone

Depth class: Moderately deep

Drainage class: Well drained

Slope: 40 to 90 percent

Parent material: Residuum that weathered from mudstone

Use and Management

Major uses: Cropland, forestland, and naturalized pastureland

Cropland

Management concerns: Erosion, slope, and soil fertility

Pasture and hayland

Management concerns: Erosion, slope, and weed competition

Urban development

Management concerns: Depth to rock, low strength, permeability, shrink-swell potential, and slope

Recreational development

Management concerns: Slope and too clayey

2. *El Descanso-Hoconuco-Cerro Gordo Association*

Very steep, well drained, shallow to very deep soils on serpentinitic mountainsides; in an extremely humid climate

Setting

Location in the survey area: North-central part, extends across the north of San

Germán municipality to Sabana Grande municipality

Landscape: Serpentine mountains

Landform: Ridges and mountain slopes

Slope: 2 to 90 percent

Composition

Percent of the survey area: 0.9 percent

El Descanso soils: 40 percent

Hoconuco soils: 40 percent

Cerro Gordo soils: 10 percent

Minor components: Indiera soils—5 percent, serpentinite rock outcrop—5 percent

Soil Characteristics

El Descanso

Surface layer:

0 to 3 inches—black mucky peat

3 to 8 inches—dark brown very gravelly clay loam

Subsoil:

8 to 15 inches—dark brown extremely paragravelly clay

Bedrock layer:

15 inches—hard, fractured, consolidated serpentinite bedrock

Depth class: Shallow

Drainage class: Well drained

Slope: 20 to 90 percent

Parent material: Residuum that weathered from serpentinite bedrock

Hoconuco

Surface layer:

0 to 3 inches—very dark brown mucky peat

3 to 7 inches—dark brown gravelly clay loam

Subsoil:

7 to 14 inches—dark reddish brown paragravelly clay

Bedrock layer:

14 to 37 inches—hard, fractured, and moderately weathered serpentinite bedrock

37 inches—hard, fractured, consolidated serpentinite bedrock

Depth class: Shallow

Drainage class: Well drained

Slope: 20 to 60 percent

Parent material: Residuum that weathered from serpentinite bedrock

Cerro Gordo

Surface layer:

0 to 3 inches—black mucky peat

3 to 11 inches—dark reddish brown gravelly clay

Subsoil:

11 to 23 inches—dark reddish brown gravelly clay loam

23 to 40 inches—red gravelly sandy clay loam

40 to 52 inches—red gravelly sandy loam

52 to 80 inches—yellowish red gravelly sandy clay loam

Depth class: Very deep

Drainage class: Well drained

Slope: 2 to 20 percent

Parent material: Iron-rich residuum that weathered from serpentinite bedrock

Use and Management

Major uses: Forestland and wildlife habitat

Cropland

Management concerns: Depth to rock, slope, and soil fertility

Pasture and hayland

Management concerns: Depth to rock, slope, and weed competition

Urban development

Management concerns: Depth to rock, slippage, and slope

Recreational development

Management concerns: Depth to rock, slope, and too clayey

Soils of the Humid Uplands

3. *El Cacique-La Taína-Nipe Association*

Very steep, well drained, shallow to very deep soils on serpentinitic mountainsides; in a very humid climate

Setting

Location in the survey area: North-central part, extends across the northern part of Hormigueros, San Germán, and Sabana Grande municipalities

Landscape: Serpentinite hills and mountains

Landform: Ridges, hills, and mountain slopes

Slope: 5 to 90 percent

Composition

Percent of the survey area: 10.9 percent

El Cacique soils: 35 percent

La Taína soils: 35 percent

Nipe soils: 15 percent

Minor components: Maresúa soils—5 percent, Rosario soils—5 percent, serpentinite outcrop—3 percent, Delicias soils—2 percent

Soil Characteristics

El Cacique

Surface layer:

0 to 6 inches—very dark grayish brown gravelly clay loam

Subsoil:

6 to 11 inches—very dark grayish brown very paragravelly clay

Bedrock layer:

11 to 14 inches—highly fractured serpentinite bedrock

14 to 86 inches—hard, consolidated serpentinite bedrock

Depth class: Shallow

Drainage class: Well drained

Slope: 5 to 90 percent

Parent material: Residuum and colluvium material that weathered from serpentinite bedrock

La Taína

Surface layer:

0 to 8 inches—very dark brown very gravelly clay

Subsoil:

8 to 13 inches—dark reddish brown extremely gravelly clay

13 to 17 inches—dark reddish brown extremely paragravelly clay loam

Bedrock layer:

17 to 29 inches—highly fractured, unconsolidated serpentinite bedrock

29 inches—hard, consolidated serpentinite bedrock

Depth class: Shallow

Drainage class: Well drained

Slope: 5 to 90 percent

Parent material: Residuum and colluvium material that weathered from serpentinite bedrock

Nipe

Surface layer:

0 to 2 inches—undecomposed plant material

2 to 11 inches—dusky red clay that has iron-manganese concretions

Subsoil:

11 to 31 inches—dusky red clay that has iron-manganese concretions

31 to 43 inches—dusky red clay

43 to 80 inches—dusky red silty clay

Depth class: Very deep

Drainage class: Well drained

Slope: 5 to 20 percent

Parent material: Iron-rich residuum that weathered from serpentinite bedrock

Use and Management

Major uses: Forestland, urban development, and wildlife habitat

Cropland

Management concerns: Depth to rock, slope, and soil fertility

Pasture and hayland

Management concerns: Depth to rock, erosion, slope, and weed competition

Urban development

Management concerns: Depth to rock, low strength, slippage, and slope

Recreational development

Management concerns: Depth to rock, slope, and too clayey

4. Caguabo-Consumo-Humatas Association

Very steep, well drained, moderately deep to very deep soils on volcanic mountainsides; in a very humid climate

Setting

Location in the survey area: Northern part, extends across Hormigueros, San Germán, Sabana Grande, and Yauco municipalities

Landscape: Hills and mountains

Landform: Ridges, hills, and mountain slopes

Slope: 12 to 60 percent

Composition

Percent of the survey area: 13.3 percent

Soil Survey of San Germán Area, Puerto Rico

Caguabo soils: 30 percent
Consumo soils: 30 percent
Humatas soils: 30 percent
Minor components: Múcara soils—8 percent, volcanic rock outcrop—2 percent

Soil Characteristics

Caguabo

Surface layer:

0 to 6 inches—dark grayish brown clay loam

Subsoil:

6 to 13 inches—brown paragravelly silty clay loam

Bedrock layer:

13 to 19 inches—highly fractured basalt bedrock

19 inches—hard, consolidated basalt bedrock

Depth class: Shallow

Drainage class: Well drained

Slope: 12 to 60 percent

Parent material: Residuum and colluvium material that weathered from basalt bedrock

Consumo

Surface layer:

0 to 5 inches—strong brown clay

Subsoil:

5 to 11 inches—yellowish red clay

11 to 20 inches—yellowish red clay that has dark red mottles

Substratum:

20 to 80 inches—mottled red, reddish brownish, yellow, and very pale brown silty clay loam

Depth class: Very deep

Drainage class: Moderately well drained

Slope: 20 to 60 percent

Parent material: Residuum that weathered from basic volcanic bedrock

Humatas

Surface layer:

0 to 5 inches—red clay

Subsoil:

5 to 32 inches—red clay

32 to 44 inches—red clay saprolite material

Substratum:

44 to 60 inches—mottled dark red, red, strong brown, and reddish yellow saprolite having a texture of silty clay loam

Depth class: Very deep

Drainage class: Well drained

Slope: 12 to 60 percent

Parent material: Clayey and loamy residuum that weathered from igneous bedrock

Use and Management

Major uses: Cropland and naturalized pastureland

Cropland

Management concerns: Depth to rock, erosion, slope, and soil fertility

Pasture and hayland

Management concerns: Erosion, slope, and weed competition

Urban development

Management concerns: Depth to rock, low strength, shrink-swell potential, slippage, and slope

Recreational development

Management concerns: Depth to rock, slope, and too clayey

5. Malaya-La Tea-Limestone outcrop Association

Very steep, well drained, shallow soils derived from tuffaceous or limestone bedrock; on mountainsides; in a very humid climate

Setting

Location in the survey area: Northern part, in Hormigueros and Yauco municipalities

Landscape: Hills and mountains

Landform: Ridges, hills, and mountain slopes

Slope: 20 to 60 percent

Composition

Percent of the survey area: 4 percent

Malaya soils: 55 percent

La Tea soils: 20 percent

Limestone outcrop soils: 10 percent

Minor components: Caguabo soils—5 percent, Humatas soils—5 percent, Múcara soils—5 percent

Soil Characteristics

Malaya

Surface layer:

0 to 4 inches—brown clay

Subsoil:

4 to 10 inches—brown gravelly clay

Bedrock layer:

10 to 14 inches—highly fractured, calcareous tuffaceous bedrock

14 to 72 inches—semiconsolidated, calcareous tuffaceous bedrock

Depth class: Shallow

Drainage class: Well drained

Slope: 20 to 60 percent

Parent material: Residuum and colluvium material that weathered from calcareous tuffaceous bedrock

La Tea

Surface layer:

0 to 5 inches—very dark grayish brown very cobbly clay

Subsoil:

5 to 11 inches—very dark grayish brown gravelly clay

11 to 16 inches—very dark grayish brown paragravelly clay

Bedrock layer:

16 to 18 inches—highly fractured, semiconsolidated limestone

18 inches—hard, consolidated limestone bedrock from the Cretaceous Period

Depth class: Shallow

Drainage class: Well drained

Slope: 20 to 60 percent

Parent material: Colluvium and residuum that weathered from limestone bedrock

Limestone outcrop

Bedrock layer:

0 to 80 inches—hard, consolidated limestone bedrock from the Cretaceous Period

Depth class: Very shallow

Slope: 20 to 60 percent

Parent material: Limestone from the Cretaceous Period

Use and Management

Major uses: Forestland, naturalized pastureland, and wildlife habitat

Cropland

Management concerns: Depth to rock and slope

Pasture and hayland

Management concerns: Depth to rock and slope

Urban development

Management concerns: Depth to rock and slope

Recreational development

Management concerns: Depth to rock and slope

6. Montegrando-Voladora-Guanajibo Association

Gently sloping to moderately steep, very deep, somewhat poorly drained to well drained soils on alluvial fans and low hills; in a humid climate

Setting

Location in the survey area: Central part, extends across Cabo Rojo, Hormigueros, San Germán, and Sabana Grande municipalities

Landscape: Uplands, hills, and coastal plains

Landform: Alluvial fans, low hills, and terraces

Slope: 2 to 20 percent

Composition

Percent of the survey area: 2.5 percent

Montegrando soils: 40 percent

Voladora soils: 25 percent

Guanajibo soils: 20 percent

Minor components: Cabo Rojo soils—5 percent, Delicias soils—5 percent, Maní soils—5 percent

Soil Characteristics

Montegrando

Surface layer:

0 to 6 inches—dark yellowish brown clay

6 to 10 inches—dark grayish brown clay that has black manganese concretions

Subsoil:

10 to 14 inches—dark yellowish brown clay that has black manganese concretions and yellowish brown and gray mottles

14 to 24 inches—yellowish brown clay that has black manganese concretions, calcium carbonate concretions, and gray mottles

Substratum:

24 to 32 inches—yellowish brown gravelly clay that has black manganese concretions and grayish brown and gray mottles

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32 to 60 inches—gray gravelly clay that has black manganese concretions, calcium carbonate concretions, and yellowish brown and gray mottles

Depth class: Very deep

Drainage class: Somewhat poorly drained

Seasonal high water table: Apparent, at a depth of 2 to 5 feet from July through September

Slope: 2 to 12 percent

Parent material: Stratified alluvial sediments over gravelly colluvium

Voladora

Surface layer:

0 to 2 inches—brown clay

Subsoil:

2 to 8 inches—dark reddish brown clay that has dark red mottles

8 to 15 inches—dark reddish brown clay

15 to 20 inches—dark reddish brown clay that has strong brown and very pale brown relic and contemporary mottles and dark red plinthite

20 to 48 inches—dark yellowish brown clay that has strong brown and very pale brown relic and contemporary mottles and dark red plinthite

Substratum:

48 to 60 inches—brownish yellow clay that has dark red, strong brown, and white mottles

Depth class: Very deep

Drainage class: Moderately well drained

Seasonal high water table: None within a depth of 60 inches

Slope: 5 to 20 percent

Parent material: Fine textured volcanic and marine sediments

Guanajibo

Surface layer:

0 to 10 inches—very dark reddish brown gravelly sandy clay loam

Subsoil:

10 to 21 inches—strong brown clay that has red mottles

21 to 37 inches—strong brown clay that has plinthite and red mottles

37 to 63 inches—mottled light olive brown, pale yellow, dark red, strong brown, and brown clay that has plinthite

Depth class: Very deep

Drainage class: Well drained

Slope: 2 to 12 percent

Parent material: Fine textured sediments of mixed origin

Use and Management

Major uses: Cropland, naturalized pastureland, pasture, and urban development

Cropland

Management concerns: Erosion and slope

Pasture and hayland

Management concerns: Seasonal wetness, slope, and weed competition

Urban development

Management concerns: Shrink-swell potential and slope

Recreational development

Management concerns: Slope and too clayey

Soils of the Humid Coastal Plains

7. *Toa-Coloso-Reilly Association*

Nearly level, very deep, somewhat poorly drained to well drained soils on flood plains; in a humid climate

Setting

Location in the survey area: Central to northwestern parts, extends across San Germán, Hormigueros, and Cabo Rojo municipalities

Landscape: River valleys

Landform: Flood plains

Slope: 0 to 2 percent

Composition

Percent of the survey area: 6.5 percent

Toa soils: 45 percent

Coloso soils: 35 percent

Reilly soils: 10 percent

Minor components: Bajura soils—5 percent, Dique soils—5 percent

Soil Characteristics

Toa

Surface layer:

0 to 8 inches—dark brown clay loam

Subsurface layer:

8 to 17 inches—dark brown clay loam

Subsoil:

17 to 29 inches—dark yellowish brown silty clay loam that has dark brown mottles

29 to 43 inches—dark brown silty clay loam that has reddish brown mottles

43 to 65 inches—dark yellowish brown clay loam that has manganese concretions and yellowish brown and light gray mottles

Depth class: Very deep

Drainage class: Well drained

Seasonal high water table: None within a depth of 60 inches

Slope: 0 to 2 percent

Parent material: Stratified alluvium of mixed origin

Coloso

Surface layer:

0 to 11 inches—very dark gray clay

Subsoil:

11 to 21 inches—very dark grayish brown clay that has iron-manganese nodules

21 to 31 inches—dark grayish brown clay that has iron-manganese nodules and yellowish brown mottles

Substratum:

31 to 46 inches—light olive brown clay that has iron-manganese nodules and yellowish brown and greenish gray mottles

46 to 75 inches—pale olive clay that has greenish gray and olive yellow mottles and yellowish brown iron-manganese nodules

75 to 90 inches—grayish brown clay that has greenish gray and yellowish brown mottles and black iron-manganese nodules

Depth class: Very deep

Drainage class: Somewhat poorly drained

Seasonal high water table: Apparent, at the surface to a depth of 4 feet from July through September

Slope: 0 to 2 percent

Parent material: Stratified alluvium of mixed origin

Reilly

Surface layer:

0 to 4 inches—dark olive brown sandy loam

Substratum:

4 to 8 inches—dark olive brown loamy sand

8 to 11 inches—dark olive brown fine sandy loam that has yellowish brown mottles

11 to 17 inches—dark grayish brown fine sandy loam that has reddish brown mottles

17 to 23 inches—dark olive brown extremely gravelly coarse sand

23 to 32 inches—very dark grayish brown sand

32 to 36 inches—very dark grayish brown loam that has yellowish brown mottles

36 to 80 inches—very dark grayish brown extremely gravelly sand

Depth class: Very deep

Drainage class: Excessively drained

Seasonal high water table: Apparent, at a depth of 2½ to 5 feet from August through October

Slope: 0 to 2 percent

Parent material: Stratified alluvium of mixed origin

Use and Management

Major uses: Cropland and pasture

Cropland

Management concerns: Flooding and low available water capacity

Pasture and hayland

Management concerns: Flooding and low available water capacity

Urban development

Management concerns: Low strength and flooding

Recreational development

Management concerns: Flooding and too clayey

8. Bajura-Joyuda-Cataño Association

Nearly level, very deep, poorly drained to excessively well drained soils in salt marshes, on beaches, and in depressions; in a humid climate

Setting

Location in the survey area: Northwestern part, and in Cabo Rojo municipality, near the Joyuda Lagoon

Landscape: Coastal plains and river valleys

Landform: Flood plains, coastal beaches, depressions, and salt marshes

Slope: 0 to 2 percent

Composition

Percent of the survey area: 1.3 percent

Bajura soils: 55 percent

Joyuda soils: 30 percent

Cataño soils: 10 percent

Minor components: Coloso soils—2 percent, Toa soils—2 percent, Atolladero soils—1 percent

Soil Characteristics

Bajura

Surface layer:

0 to 4 inches—very dark grayish brown clay

Subsoil:

4 to 16 inches—very dark grayish brown clay that has dark reddish brown and dark brown mottles

16 to 42 inches—very dark gray clay that has very dark gray and dark brown mottles

Substratum:

42 to 47 inches—dark greenish gray clay that has yellowish red mottles

47 to 60 inches—black clay that has yellowish red and dark greenish gray mottles

60 to 80 inches—black clay that has dark red mottles

Depth class: Very deep

Drainage class: Poorly drained

Seasonal high water table: Apparent, at a depth of 1/2 to 2 1/2 feet from July through September

Slope: 0 to 1 percent

Parent material: Alluvium of mixed origin

Joyuda

Surface layer:

0 to 4 inches—black mucky peat

Subsurface layer:

4 to 80 inches—greenish black muck

Depth class: Very deep

Drainage class: Very poorly drained

Seasonal high water table: Above the surface, or the soil is flooded by high tides, from July through October

Slope: 0 to 1 percent

Parent material: Decomposed organic material

Cataño

Surface layer:

0 to 8 inches—very dark gray coarse sand

Subsurface layer:

8 to 11 inches—very dark grayish brown coarse sand

Substratum:

11 to 55 inches—grayish brown coarse sand

55 to 80 inches—light yellowish brown coarse sand that has cemented aggregates of filaments and threads of calcium carbonate

Depth class: Very deep

Drainage class: Excessively drained

Seasonal high water table: None within a depth of 80 inches

Slope: 0 to 2 percent

Parent material: Beach and sand deposits

Use and Management

Major uses: Pasture, recreational development, and wildlife habitat

Cropland

Management concerns: Flooding, tilth, and very low available water capacity

Pasture and hayland

Management concerns: Flooding and very low available water capacity

Urban development

Management concerns: Flooding, instability of cutbanks, poor filter, shrink-swell potential, and subsides

Recreational development

Management concerns: Excess of humus, flooding, too clayey, and too sandy

Soils of the Semiarid Uplands

9. Descalabrado-San Germán-Pozo Blanco Association

Strongly sloping to very steep, well drained, shallow to very deep soils derived from volcanic rock or limestone; on alluvial fans, hills, and mountains; in a semiarid climate

Setting

Location in the survey area: Central part, extends across Cabo Rojo, San Germán, Sabana Grande, Lajas, Guánica, and Yauco municipalities

Landscape: Uplands and hills

Landform: Alluvial fans and hill slopes

Slope: 0 to 60 percent

Composition

Percent of the survey area: 16.5 percent

Descalabrado soils: 60 percent

San Germán soils: 15 percent

Pozo Blanco soils: 10 percent

Minor components: Aguilita soils—5 percent, Duey soils—5 percent, Jácana soils—5 percent

Soil Characteristics

Descalabrado

Surface layer:

0 to 5 inches—dark brown clay

Subsoil:

5 to 10 inches—dark brown clay

Bedrock layer:

10 to 18 inches—highly fractured, unconsolidated, basic volcanic bedrock

18 inches—hard, consolidated, basic volcanic bedrock

Depth class: Shallow

Drainage class: Well drained

Slope: 2 to 60 percent

Parent material: Residuum and colluvium that weathered from basic volcanic bedrock

San Germán

Surface layer:

0 to 4 inches—very dark grayish brown cobbly clay loam

4 to 10 inches—very dark grayish brown extremely gravelly clay loam

Bedrock layer:

10 to 80 inches—hard, consolidated limestone bedrock

Depth class: Shallow

Drainage class: Well drained

Slope: 5 to 60 percent

Parent material: Residuum that weathered from limestone bedrock from the Cretaceous Period

Pozo Blanco

Surface layer:

0 to 7 inches—very dark grayish brown clay

Subsoil:

7 to 15 inches—very dark grayish brown clay that has soft masses of calcium carbonate

15 to 22 inches—dark brown clay that has soft masses of calcium carbonate

22 to 30 inches—brown gravelly clay loam that has very pale brown soft masses of calcium carbonate

Substratum:

30 to 40 inches—dark yellowish brown gravelly loam that has very pale brown concretions of calcium carbonate

40 to 60 inches—yellowish brown loam that has very pale brown concretions of calcium carbonate

Depth class: Very deep

Drainage class: Well drained

Slope: 0 to 20 percent

Parent material: Alluvium and colluvium over residuum that was derived from soft limestone

Use and Management

Major uses: Naturalized pastureland and pasture

Cropland

Management concerns: Depth to rock, low available water capacity, and slope

Pasture and hayland

Management concerns: Depth to rock, low available water capacity, slope, and weed competition

Urban development

Management concerns: Depth to rock, large stones, low strength, shrink-swell potential, and slope

Recreational development

Management concerns: Depth to rock, large stones, slope, and too clayey

Soils of the Arid Uplands

10. Llanos Costa-Cerro Mariquita-Bermeja Association

Strongly sloping to very steep, well drained, shallow to very deep soils on volcanic hills and mountains; in an arid climate

Setting

Location in the survey area: Southwestern part, extends across Cabo Rojo municipality to Lajas municipality at the Sierra Bermeja Mountain Range

Landscape: Uplands, hills, and mountains

Landform: Alluvial fans, ridges, hills, and mountain slopes

Slope: 2 to 60 percent

Composition

Percent of the survey area: 4.6 percent

Llanos Costa soils: 40 percent

Cerro Mariquita soils: 35 percent

Bermeja soils: 15 percent

Minor components: Maguayo soils—5 percent, Casabe soils—3 percent,
serpentinite outcrop—2 percent

Soil Characteristics

Llanos Costa

Surface layer:

0 to 9 inches—dark brown loam

Subsoil:

9 to 15 inches—dark reddish brown gravelly clay loam

15 to 29 inches—yellowish red gravelly clay

29 to 43 inches—yellowish red very gravelly clay

43 to 56 inches—strong brown and yellowish red very gravelly sandy clay loam

56 to 68 inches—yellowish red very gravelly sandy clay loam

68 to 80 inches—yellowish red gravelly sandy clay loam

Depth class: Very deep

Drainage class: Well drained

Slope: 2 to 12 percent

Parent material: Gravelly sediments that weathered from basalt, chert, and rhyolite

Cerro Mariquita

Surface layer:

0 to 2 inches—very dark brown gravelly clay loam

Subsoil:

2 to 13 inches—dark reddish brown extremely paragravelly clay

Bedrock layer:

13 to 23 inches—highly fractured, unconsolidated chert

23 inches—hard, unweathered chert bedrock

Depth class: Shallow

Drainage class: Well drained

Slope: 5 to 60 percent

Parent material: Residuum and colluvium material that weathered from basalt, chert,
and rhyolite

Bermeja

Surface layer:

0 to 2 inches—dark reddish brown extremely cobbly sandy loam

Subsoil:

2 to 8 inches—reddish brown extremely paragravelly sandy clay loam

Bedrock layer:

8 to 27 inches—red saprolite that has a texture of extremely paragravelly clay

27 inches—hard, unweathered chert bedrock

Depth class: Shallow

Drainage class: Well drained

Slope: 5 to 60 percent

Parent material: Residuum and colluvium material that weathered from basalt, chert,
and rhyolite

Use and Management

Major uses: Hayland, naturalized pastureland, pasture, and wildlife habitat

Cropland

Management concerns: Depth to rock, slope, tilth, and very low available water capacity

Pasture and hayland

Management concerns: Depth to rock, slope, and weed competition

Urban development

Management concerns: Depth to rock, low strength, shrink-swell potential, and slope

Recreational development

Management concerns: Depth to rock, slope, and slow permeability

11. Pitahaya-Limestone outcrop-La Covana Association

Strongly sloping to very steep, well drained, shallow soils on limestone hills and mountains; in an arid climate

Setting

Location in the survey area: Southern part, extends across Guánica and Yauco municipalities at Bosque Seco State Forest

Landscape: Hills

Landform: Ridges and hill slopes

Slope: 12 to 90 percent

Composition

Percent of the survey area: 7.2 percent

Pitahaya soils: 50 percent

Limestone outcrop: 25 percent

La Covana soils: 20 percent

Minor components: Seboruco soils—5 percent

Soil Characteristics

Pitahaya

Surface layer:

0 to 2 inches—dark brown gravelly clay

Subsurface layer:

2 to 11 inches—brown extremely gravelly clay

Bedrock layer:

11 to 27 inches—very pale brown, hard, semiconsolidated fractured limestone

27 to 80 inches—very pale brown, hard, consolidated limestone bedrock

Depth class: Shallow

Drainage class: Well drained

Slope: 40 to 90 percent

Parent material: Residuum and colluvium that weathered from limestone bedrock

Limestone outcrop

Bedrock layer:

0 to 80 inches—hard, consolidated limestone bedrock from the Tertiary Period

Depth class: Very shallow

Slope: 40 to 90 percent

Parent material: Limestone bedrock from the Tertiary Period

La Covana

Surface layer:

0 to 5 inches—dark reddish brown gravelly clay

Subsoil:

5 to 19 inches—yellowish red extremely gravelly clay that has calcium carbonate concretions

19 to 31 inches—very pale brown indurated petrocalcic material

Substratum:

31 to 80 inches—very pale brown silt loam that has yellow mottles and calcium carbonate concretions

Depth class: Shallow

Drainage class: Well drained

Slope: 12 to 40 percent

Parent material: Material that weathered from limestone bedrock

Use and Management

Major uses: Forestland and wildlife habitat

Cropland

Management concerns: Depth to hard pan, slope, very low available water capacity, depth to rock

Pasture and hayland

Management concerns: Depth to hard pan, depth to rock, slope, and very low available water capacity

Urban development

Management concerns: Depth to cemented pan, depth to rock, and slope

Recreational development

Management concerns: Depth to cemented pan, depth to rock, rocks (small), and slope

12. Costa-Pitahaya-El Papayo Association

Strongly sloping to steep, well drained, shallow soils on limestone and volcanic hills; in an arid climate

Setting

Location in the survey area: Southern part, extends across Cabo Rojo, Lajas, Guánica, and Yauco municipalities

Landscape: Hills

Landform: Ridges and hill slopes

Slope: 2 to 60 percent

Composition

Percent of the survey area: 6.2 percent

Costa soils: 45 percent

Pitahaya soils: 25 percent

El Papayo soils: 20 percent

Minor components: Altamira soils—5 percent, Montalva soils—5 percent

Soil Characteristics

Costa

Surface layer:

0 to 7 inches—dark yellowish brown very gravelly clay

Subsurface layer:

7 to 11 inches—dark yellowish brown very gravelly clay that has soft masses and concretions of calcium carbonate

Substratum:

11 to 19 inches—light yellowish brown silty clay

Bedrock layer:

19 to 27 inches—light yellowish brown, soft, semiconsolidated fractured limestone that has a texture of silty clay

27 to 43 inches—yellow and very pale brown, soft, semiconsolidated fractured limestone that has a texture of loam

43 to 63 inches—very pale brown, consolidated limestone bedrock

Depth class: Shallow

Drainage class: Well drained

Slope: 5 to 60 percent

Parent material: Residuum and colluvium material that weathered from limestone bedrock

Pitahaya

Surface layer:

0 to 2 inches—dark brown gravelly clay

Subsurface layer:

2 to 11 inches—brown extremely gravelly clay

Bedrock layer:

11 to 27 inches—very pale brown, hard, semiconsolidated, fractured limestone bedrock

27 to 80 inches—very pale brown, hard, consolidated limestone bedrock

Depth class: Shallow

Drainage class: Well drained

Slope: 5 to 60 percent

Parent material: Residuum and colluvium material that weathered from limestone bedrock

El Papayo

Surface layer:

0 to 2 inches—dark brown gravelly clay loam

Subsoil:

2 to 14 inches—dark brown clay

Bedrock layer:

14 to 16 inches—highly fractured, unconsolidated andesite bedrock

16 inches—hard, consolidated andesite bedrock

Depth class: Shallow

Drainage class: Well drained

Slope: 2 to 60 percent

Parent material: Residuum and colluvium that weathered from basic volcanic bedrock

Use and Management

Major uses: Naturalized pastureland, pasture, urban development, and wildlife habitat

Cropland

Management concerns: Depth to rock, slope, and very low available water capacity

Pasture and hayland

Management concerns: Depth to rock, slope, and very low available water capacity

Urban development

Management concerns: Depth to rock, slippage, shrink-swell potential, and slope

Recreational development

Management concerns: Depth to rock, slope, and stones (small)

Soils of the Semiarid Coastal Plains

13. *San Antón-Vayas-Cortada Association*

Nearly level, poorly drained to well drained, very deep soils on flood plains; in a semiarid climate

Setting

Location in the survey area: Southern part, extends across Guánica and Yauco municipalities

Landscape: River valley,

Landform: Flood plains

Slope: 0 to 2 percent

Composition

Percent of the survey area: 2.3 percent

San Antón soils: 70 percent

Vayas soils: 15 percent

Cortada soils: 10 percent

Minor components: La Luna soils—5 percent

Soil Characteristics

San Antón

Surface layer:

0 to 13 inches—very dark grayish brown clay loam

Subsoil:

13 to 24 inches—very dark grayish brown and dark brown silty clay loam

24 to 31 inches—very dark grayish brown and dark brown clay loam

31 to 41 inches—very dark grayish brown sandy clay loam

41 to 80 inches—dark brown sandy clay loam

Depth class: Very deep

Drainage class: Well drained

Seasonal high water table: None within a depth of 80 inches

Slope: 0 to 2 percent

Parent material: Stratified alluvial deposits of mixed origin

Vayas

Surface layer:

0 to 5 inches—very dark grayish brown silty clay

5 to 12 inches—very dark grayish brown silty clay loam

12 to 23 inches—dark grayish brown silty clay loam that has dark yellowish brown and very dark greenish gray mottles

Substratum:

23 to 49 inches—olive gray and brown silty clay loam that has dark yellowish brown and very dark greenish gray mottles

49 to 65 inches—olive gray silty clay loam that has dark yellowish brown and dark greenish gray mottles

Depth class: Very deep

Drainage class: Poorly drained

Seasonal high water table: Apparent, at a depth of 1 to 2½ feet from September through October

Slope: 0 to 2 percent

Parent material: Fine textured alluvial deposits of mixed origin

Cortada

Surface layer:

0 to 6 inches—very dark gray silty clay loam

Subsurface layer:

6 to 15 inches—very dark brown silty clay loam

Subsoil:

15 to 23 inches—very dark grayish brown silty clay loam that has very pale brown masses of calcium carbonate

23 to 34 inches—very dark grayish brown clay loam that has very pale brown masses of calcium carbonate

34 to 45 inches—very dark grayish brown sandy clay loam that has very pale brown masses of calcium carbonate

Substratum:

45 to 56 inches—dark gray sandy loam

56 to 63 inches—dark gray loam

63 to 80 inches—dark gray gravelly sandy clay loam

Depth class: Very deep

Drainage class: Well drained

Seasonal high water table: None within a depth of 80 inches

Slope: 0 to 2 percent

Parent material: Stratified alluvial deposits

Use and Management

Major uses: Cropland and naturalized pastureland

Cropland

Management concerns: Flooding

Pasture and hayland

Management concerns: Flooding

Urban development

Management concerns: Low percolation, low strength, and flooding

Recreational development

Management concerns: Flooding

14. Aguirre-Guánica-Cartagena Association

Nearly level, somewhat poorly drained to very poorly drained, very deep, saline-alkaline and sodic soils on basin floors; in a semiarid climate

Setting

Location in the survey area: South-central part, extends across Cabo Rojo, Lajas, and Guánica municipalities at the Lajas Valley Agricultural Reserve

Landscape: Basins

Landform: Basin floors, depressions, and fan skirts

Slope: 0 to 2 percent

Composition

Percent of the survey area: 7.7 percent

Aguirre soils: 35 percent

Guánica soils: 35 percent

Cartagena soils: 25 percent

Minor components: Fé soils—3 percent, Fraternidad soils—2 percent

Soil Characteristics

Aguirre

Surface layer:

0 to 18 inches—very dark gray clay

Subsoil:

18 to 26 inches—dark gray clay that has few black iron-manganese concretions

26 to 36 inches—mottled light olive brown and dark gray clay that has few black iron-manganese concretions

36 to 45 inches—olive gray clay that has few black iron-manganese concretions

45 to 80 inches—light olive brown clay that has few black iron-manganese concretions

Depth class: Very deep

Drainage class: Poorly drained

Seasonal high water table: Perched, at the surface to 2 feet above the surface from August through October

Slope: 0 to 1 percent

Parent material: Clayey marine sediments and material derived from limestone and igneous rocks

Guánica

Surface layer:

0 to 4 inches—black clay

Subsurface layer:

4 to 12 inches—black clay that has calcium carbonate concretions

Subsoil:

12 to 25 inches—black clay that has calcium carbonate concretions

25 to 33 inches—black and dark reddish brown clay that has calcium carbonate concretions

33 to 52 inches—dark reddish brown clay that has calcium carbonate concretions

52 to 68 inches—reddish brown clay that has salt crystals, soft masses of calcium carbonate, and iron-manganese concretions

68 to 79 inches—reddish brown clay that has salt crystals, soft masses of calcium carbonate, and iron-manganese concretions

Depth class: Very deep

Drainage class: Somewhat poorly drained

Seasonal high water table: Perched, at the surface to 1½ feet above the surface from August through October

Slope: 0 to 1 percent

Parent material: Clayey alluvial sediments

Cartagena

Surface layer:

0 to 7 inches—very dark grayish brown clay that has iron-manganese concretions

Subsurface layer:

7 to 15 inches—very dark grayish brown clay that has iron-manganese concretions

15 to 22 inches—very dark gray clay that has iron-manganese concretions

Subsoil:

22 to 30 inches—black clay

30 to 46 inches—dark grayish brown clay that has iron-manganese concretions

46 to 60 inches—brown clay that has iron-manganese concretions

Depth class: Very deep

Drainage class: Somewhat poorly drained

Seasonal high water table: Perched, at the surface to ½ foot above the surface from August through September

Slope: 0 to 2 percent

Parent material: Alluvium and clayey marine sediments

Use and Management

Major uses: Cropland, hayland, and pasture

Cropland

Management concerns: Ponding, salinity, sodicity, and tilth

Pasture and hayland

Management concerns: Ponding, salinity, sodicity, and tilth

Urban development

Management concerns: Low strength, permeability, ponding, and shrink-swell potential

Recreational development

Management concerns: Permeability, ponding, and too clayey

15. Fraternidad-Palmarejo-Santa Isabel Association

Nearly level to gently sloping, moderately well drained, very deep soils on alluvial flats and fans; in a semiarid climate

Setting

Location in the survey area: South-central part, extends across Cabo Rojo, Lajas, and Guánica municipalities at the Lajas Valley Agricultural Reserve

Landscape: Basins and coastal plains

Landform: Fan skirts and alluvial fans

Slope: 0 to 12 percent

Composition

Percent of the survey area: 6.2 percent

Fraternidad soils: 80 percent

Palmarejo soils: 10 percent

Santa Isabel soils: 5 percent

Minor components: Cartagena soils—3 percent, Mariana soils—2 percent

Soil Characteristics

Fraternidad

Surface layer:

0 to 13 inches—very dark gray clay

Subsurface layer:

13 to 17 inches—very dark grayish brown and brown clay

Subsoil:

17 to 42 inches—dark yellowish brown clay that has iron-manganese concretions and filaments of calcium carbonate

42 to 65 inches—dark yellowish brown and brown clay that has iron-manganese concretions and filaments of calcium carbonate

Depth class: Very deep

Drainage class: Moderately well drained

Seasonal high water table: None within a depth of 65 inches

Slope: 0 to 5 percent

Parent material: Clayey alluvial sediments that weathered from igneous, metamorphic, and sedimentary rocks

Palmarejo

Surface layer:

0 to 9 inches—dark brown loam

Subsoil:

9 to 18 inches—mottled yellowish brown and dark brown clay

18 to 30 inches—yellowish brown clay that has dark yellowish brown mottles

30 to 41 inches—mottled yellowish brown and white clay loam

Substratum:

41 to 60 inches—mottled red and white sandy clay loam that has black manganese concretions

Depth class: Very deep

Drainage class: Moderately well drained

Seasonal high water table: None within a depth of 60 inches

Slope: 0 to 12 percent

Parent material: Sediments that weathered from volcanic bedrock

Santa Isabel

Surface layer:

0 to 10 inches—black clay

Subsurface layer:

10 to 28 inches—black clay

28 to 50 inches—very dark grayish clay

50 to 64 inches—black clay

Subsoil:

64 to 69 inches—dark brown clay

Depth class: Very deep

Drainage class: Moderately well drained

Seasonal high water table: Apparent, at a depth of 5 to 6 feet from September through November

Slope: 0 to 2 percent

Parent material: Clayey alluvial sediments that weathered from igneous, metamorphic, and sedimentary rocks

Use and Management

Major uses: Cropland, hayland, and pasture

Cropland

Management concerns: Slope and tilth

Pasture and hayland

Management concerns: Slope and tilth

Urban development

Management concerns: Shrink-swell potential, slope, and very slow permeability

Recreational development

Management concerns: Slope and too clayey

Soils of the Arid Coastal Plains

16. Melones-La Luna-Bahía Association

Nearly level to gently sloping, well drained to excessively drained, very deep soils on flood plains and alluvial fans; in an arid climate

Setting

Location in the survey area: Southern and southwestern parts, and in Cabo Rojo, Lajas, and Guánica municipalities

Landscape: Coastal plains and river valleys

Landform: Alluvial fans, coastal plains, and flood plains

Slope: 0 to 12 percent

Composition

Percent of the survey area: 2.1 percent

Melones soils: 40 percent

La Luna soils: 25 percent

Bahía soils: 25 percent

Minor components: Guayacán soils—3 percent, San Antón soils—3 percent,

Guayabo soils—2 percent, Sosa soils—2 percent

Soil Characteristics

Melones

Surface layer:

0 to 7 inches—dark brown clay

Subsoil:

7 to 18 inches—brown clay

18 to 37 inches—dark brown clay that has pinkish white soft masses of calcium carbonate

37 to 46 inches—brown clay that has pinkish white soft masses of calcium carbonate

46 to 66 inches—brown clay

66 to 70 inches—strong brown gravelly clay loam

Substratum:

70 to 80 inches—yellowish brown clay

Depth class: Very deep

Drainage class: Well drained

Slope: 0 to 12 percent

Parent material: Loamy and clayey alluvial and marine sediments

La Luna

Surface layer:

0 to 11 inches—very dark grayish brown silty clay loam

Subsoil:

11 to 20 inches—very dark grayish brown silty clay loam

20 to 32 inches—very dark grayish brown silty clay that has light yellowish brown masses of calcium carbonate

32 to 44 inches—olive brown silty clay loam that has light yellowish brown masses of calcium carbonate

44 to 58 inches—dark grayish brown silty clay loam that has light yellowish brown masses of calcium carbonate

Substratum:

58 to 75 inches—dark grayish brown silty clay loam that has brown mottles and light yellowish brown masses of calcium carbonate

Depth class: Very deep

Drainage class: Well drained

Seasonal high water table: None within a depth of 75 inches

Slope: 0 to 2 percent

Parent material: Alluvial deposits of mixed origin

Bahía

Surface layer:

0 to 6 inches—dark reddish brown fine sand

Subsoil:

6 to 17 inches—dark reddish brown loamy sand

17 to 26 inches—dark red sand

26 to 45 inches—dark reddish brown loamy sand

45 to 60 inches—dark reddish brown fine sandy loam

60 to 67 inches—dark reddish brown fine sandy loam

Depth class: Very deep

Drainage class: Excessively drained

Seasonal high water table: None within a depth of 67 inches

Slope: 0 to 5 percent

Parent material: Sandy marine deposits

Use and Management

Major uses: Cropland, urban development, and wildlife habitat

Cropland

Management concerns: Occasional flooding; tilth; and very low available water capacity

Pasture and hayland

Management concerns: Very low available water capacity and weed competition

Urban development

Management concerns: Low strength, poor filter, shrink-swell potential, slow permeability, and occasional flooding

Recreational development

Management concerns: Occasional flooding; too clayey; and too sandy

17. Manglillo-Boquerón-Serrano Association

Nearly level, poorly drained to very poorly drained, very deep soils in salt marshes, on beaches, and in depressions; in an arid climate

Setting

Location in the survey area: South coastal part along the Caribbean Sea, and extends across Cabo Rojo, Lajas, Guánica, and Yauco municipalities

Landscape: Coastal plains

Landform: Salt marshes and tidal flats

Slope: 0 to 1 percent

Composition

Percent of the survey area: 1.9 percent

Manglillo soils: 50 percent

Boquerón soils: 30 percent

Serrano soils: 15 percent

Minor components: Bahía Salinas soils—3 percent, Teresa soils—2 percent

Soil Characteristics

Manglillo

Surface layer:

0 to 5 inches—black muck

Subsurface layer:

5 to 24 inches—dark brown and very dark brown mucky peat

Substratum:

24 to 43 inches—dark greenish gray mucky loam

43 to 60 inches—light greenish gray and greenish gray sandy loam

Depth class: Very deep

Drainage class: Very poorly drained

Seasonal high water table: Above the surface, or the soil is flooded by high tides, from July through October

Slope: 0 to 1 percent

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Parent material: Decomposed organic material overlying regolith consisting of sand-sized shell fragments, quartz grains, and subrounded volcanic fragments on recent beach deposits

Boquerón

Surface layer:

0 to 2 inches—very dark gray muck

2 to 4 inches—dark grayish brown silty clay that has olive brown mottles

Substratum:

4 to 8 inches—black and very dark gray mucky clay loam

8 to 12 inches—dark gray silty clay that has red and yellowish red mottles

12 to 55 inches—dark gray silty clay

55 to 80 inches—greenish gray clay that has olive brown mottles

Depth class: Very deep

Drainage class: Very poorly drained

Seasonal high water table: Above the surface, or the soil is flooded by high tides, from July through October

Slope: 0 to 1 percent

Parent material: Clayey alluvial and marine sediments

Serrano

Surface layer:

0 to 3 inches—olive gray sandy loam

Subsoil:

3 to 14 inches—greenish gray loam

Substratum:

14 to 22 inches—greenish gray very gravelly loam

22 to 55 inches—dark greenish gray extremely gravelly loamy sand

Depth class: Very deep

Drainage class: Poorly drained

Seasonal high water table: Apparent, at a depth of 2½ to 3½ feet from May through November

Slope: 0 to 1 percent

Parent material: Moderately fine material over coarse textured sediments

Use and Management

Major uses: Wildlife habitat

Cropland

Management concerns: Flooding and too sandy

Pasture and hayland

Management concerns: Flooding and too sandy

Urban development

Management concerns: Flooding, shrink-swell potential, and subsides

Recreational development

Management concerns: Excess of humus, too clayey, too sandy, and wetness

Detailed Soil Map Units

The map units delineated on the detailed soil maps in this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The contrasting components are mentioned in the map unit descriptions. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. The soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name

of a soil phase commonly indicates a feature that affects use or management. For example, Agüeybaná clay, 20 to 60 percent slopes, is a phase of the Agüeybaná series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. El Cacique-La Taína complex, 60 to 90 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Manglillo, Boquerón, and Serrano soils, very frequently flooded, is an undifferentiated group in this survey area.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. The unit Salt pits is an example.

Table 4 gives the acreage and proportionate extent of each map unit in the survey area. Other tables give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

AbF—Agüeybaná clay, 20 to 60 percent slopes

Setting

Landscape: Mountain ranges

Landform: Ridges and mountain slopes

Major uses: Cropland and forestland

Elevation: 2,460 to 3,609 feet

Composition

Agüeybaná and similar soils: 85 percent

Dissimilar soils: 15 percent

Typical Profile

Surface layer:

0 to 14 inches—strong brown clay

Subsoil:

14 to 44 inches—red clay

44 to 57 inches—red silty clay

Substratum:

57 to 80 inches—mottled red, reddish brown, yellowish red, yellow, and dark brown clay loam

Minor Components

Dissimilar:

- Cuchillas soils, which do not have an argillic horizon, have a coarser textured profile than the Agüeybaná soil, and are moderately deep to volcanic rock
- Maricao soils, which have a solum that is 15 to 25 inches thick

Similar:

- Agüeybaná soils that have slopes of 60 to 90 percent

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Residuum that weathered from basalt

Surface runoff: High

Drainage class: Well drained

Permeability: Moderate

Available water capacity: High

Hazard of water erosion: High

Rock fragments in the surface layer: Less than 10 percent, by volume

Shrink-swell potential: Moderate

Natural fertility: Low

Content of organic matter in the surface layer: Moderate

Reaction: Strongly acid or very strongly acid throughout

Land Use

Dominant uses: Cropland

Other uses: Forestland

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Bananas; coffee; plantains

Management concerns: Erosion; soil fertility; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Moderately suited to pasture; unsuited to hayland

Commonly grown crops: Guineagrass; pangola grass

Management concerns: Erosion; slope; weed competition

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The steep and very steep slopes increase the difficulty of management.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Preparing seedbeds on the contour or across the slope helps to control erosion and increases the rate of germination.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.

- The steep and very steep slopes increase the difficulty of management.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Slope; shrink-swell potential

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.
- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Permeability; slope

Management measures and considerations:

- The use of an alternate system should be considered.
- Cutting and filling may be needed in the sloping areas.
- The use of suitable fill material from an offsite location can improve system performance.
- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; slope; shrink-swell potential

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: VIe

AgD—Aguilita silty clay loam, 5 to 20 percent slopes

Setting

Landscape: Hills and uplands

Landform: Ridges and hillslopes

Major uses: Hayland and pasture

Elevation: 80 to 1,312 feet

Composition

Aguilita and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 6 inches—brown silty clay loam

Subsoil:

6 to 18 inches—brown silty clay loam that has soft masses of calcium carbonate

18 to 23 inches—brown clay loam that has soft masses of calcium carbonate

Substratum:

23 to 32 inches—pale brown loam that has soft masses and concretions of calcium carbonate

32 to 60 inches—pale brown loam that has soft masses and concretions of calcium carbonate

Minor Components

Dissimilar:

- Duey and San Germán soils, which are shallow to fractured limestone bedrock

Similar:

- Pozo Blanco soils, which have a finer textured profile than the Aguilita soil

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Colluvium and residuum that weathered from soft limestone bedrock

Surface runoff: Medium

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Low or moderate

Flooding: None

Hazard of water erosion: Moderate

Rock fragments in the surface layer: Less than 25 percent, by volume

Shrink-swell potential: Moderate

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Slightly alkaline or moderately alkaline

Land Use

Dominant uses: Naturalized pastureland (fig. 7)

Other uses: Hayland; pasture

Agricultural Development

Cropland

Suitability: Poorly suited

Management concerns: Erosion; slope

Pasture and hayland

Suitability: Moderately suited

Commonly grown crops: Kleberg's bluestem

Management concerns: Erosion; slope; available water capacity

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The moderately steep slopes increase the difficulty of management.
- The low available water capacity may result in lower yields.
- Including grasses and legumes in the cropping system helps to control further erosion.
- Returning crop residue to the soil helps the soil to retain moisture.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.



Figure 7.—Naturalized pastureland in an area of Aguilita silty clay loam, 5 to 20 percent slopes.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The moderately steep slopes increase the difficulty of management.
- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Moderately suited

Management concerns: Low strength; slope

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Moderately suited

Management concerns: Slope; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Moderately suited

Management concerns: Slope; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Moderately suited

Management concerns: Too clayey

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: IVe

AgF—Aguilita silty clay loam, 20 to 60 percent slopes

Setting

Landscape: Hills

Landform: Hillslopes

Major uses: Naturalized pastureland and wildlife habitat

Elevation: 164 to 1,312 feet

Composition

Aguilita and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 6 inches—brown silty clay loam

Subsoil:

6 to 18 inches—brown silty clay loam that has soft masses of calcium carbonate

18 to 23 inches—brown clay loam that has soft masses of calcium carbonate

Substratum:

23 to 32 inches—pale brown loam that has soft masses and concretions of calcium carbonate

32 to 60 inches—pale brown loam that has soft masses and concretions of calcium carbonate

Minor Components

Dissimilar:

- Duey and San Germán soils, which are shallow to fractured limestone bedrock
- Small areas of limestone rock outcrop

Similar:

- Aguilita soils that have slopes of 60 to 90 percent
- Pozo Blanco soils, which have a finer textured profile than the Aguilita soil

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Colluvium and residuum that weathered from soft limestone bedrock

Surface runoff: High

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Low or moderate

Flooding: None

Hazard of water erosion: Severe or very severe

Rock fragments in the surface layer: Less than 25 percent, by volume

Shrink-swell potential: Moderate

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Slightly alkaline or moderately alkaline

Land Use

Dominant uses: Wildlife habitat

Other uses: Naturalized pastureland

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Erosion; slope

Pasture and hayland

Suitability: Poorly suited to pasture; unsited to hayland

Commonly grown crops: Kleberg's bluestem

Management concerns: Erosion

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Erosion; slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: Vle

AkA—Aguirre clay, occasionally ponded

Setting

Landscape: Basins

Landform: Basin floors and depressions

Slope: Nearly level

Major uses: Hayland, pasture, and cropland

Elevation: Sea level to 165 feet

Composition

Aguirre and similar soils: 95 percent

Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 18 inches—very dark gray clay

Subsoil:

18 to 26 inches—dark gray clay that has few black concretions of iron-manganese

26 to 36 inches—mottled light olive brown and dark gray clay that has few black concretions of iron-manganese

36 to 45 inches—olive gray clay that has few black concretions of iron-manganese

45 to 80 inches—light olive brown clay that has few black concretions of iron-manganese

Minor Components

Dissimilar:

- Cartagena soils, which are moderately well drained and are in the higher landscape positions

Similar:

- Guánica soils, which are in positions similar to those of the Aguirre soil but have a subsoil that dominantly has hue of 5YR or redder

Soil Properties and Qualities

Depth class: Very deep

Parent material: Clayey marine sediments and material derived from limestone and igneous rock

Surface runoff: Negligible

Soil Survey of San Germán Area, Puerto Rico

Drainage class: Poorly drained

Permeability: Very slow

Available water capacity: High

Seasonal high water table: Perched, at the surface to 2 feet above the surface from August through October

Ponding: Occasional, brief periods

Hazard of water erosion: Slight

Shrink-swell potential: Very high

Natural fertility: Low

Content of organic matter in the surface layer: Moderate

Reaction: Slightly alkaline to strongly alkaline

Salinity: Very slightly saline or slightly saline

Sodicity: Slight in the surface layer and moderate or strong in the subsoil

Land Use

Dominant uses: Hayland

Other uses: Pasture; cropland

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Rice; sugar cane

Management concerns: Seasonal wetness; ponding; salinity; sodicity; tilth

Management measures and considerations:

- Salinity, sodicity, and seasonal wetness limit the use of this soil.
- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.

Pasture and hayland

Suitability: Moderately suited

Commonly grown crops: African star grass; buffelgrass; hurricanegrass; Kleberg's bluestem; para grass

Management concerns: Seasonal wetness; ponding; salinity; sodicity

Management measures and considerations:

- Salinity, sodicity, and seasonal wetness limit the use of this soil.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Seasonal wetness; ponding

Management measures and considerations:

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Unsited

Management concerns: Ponding; shrink-swell potential

Septic tank absorption fields

Suitability: Unsited

Management concerns: Ponding; restricted permeability

Local roads and streets

Suitability: Poorly suited

Management concerns: Shrink-swell potential; low strength; ponding

Management measures and considerations:

- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Unsited

Management concerns: Ponding; restricted permeability; too clayey

Picnic areas

Suitability: Unsited

Management concerns: Ponding; restricted permeability; too clayey

Playgrounds

Suitability: Unsited

Management concerns: Ponding; restricted permeability; too clayey

Paths and trails

Suitability: Unsited

Management concerns: Ponding; too clayey

Interpretive Group

Land capability classification: IVw

AlF—Aljibe-Guamá-Indiera complex, 20 to 60 percent slopes

Setting

Landscape: Mountains

Landform: Mountain slopes

Major uses: Forestland

Elevation: 2,460 to 2,790 feet

Composition

Aljibe and similar soils: 40 percent

Guamá and similar soils: 30 percent

Indiera and similar soils: 25 percent

Dissimilar soils: 5 percent

Typical Profiles

Aljibe

Surface layer:

0 to 5 inches—black mucky peat

5 to 16 inches—dusky red clay

Subsoil:

16 to 27 inches—dusky red clay

27 to 31 inches—mixed dusky red and dark reddish brown clay

31 to 35 inches—dark reddish brown silty clay loam

Bedrock:

35 to 47 inches—highly fractured, moderately weathered serpentinite bedrock

47 to 80 inches—hard, consolidated serpentinite bedrock

Guamá

Surface layer:

0 to 4 inches—black mucky peat

4 to 13 inches—dusky red clay

Subsoil:

13 to 39 inches—dark red clay

39 to 61 inches—dark reddish brown clay

Substratum:

61 to 82 inches—mottled dark red, dark reddish brown, yellowish red, reddish yellow, and olive clay

Indiera

Surface layer:

0 to 3 inches—black mucky peat

3 to 8 inches—dark reddish brown clay that has ironstone pebbles

Subsoil:

8 to 14 inches—dusky red clay

14 to 22 inches—mixed dusky red and dark red clay

22 to 47 inches—mottled dusky red, dark reddish brown, and brown clay

Bedrock:

47 to 82 inches—highly fractured, slightly weathered serpentinite bedrock

82 inches—hard, consolidated serpentinite bedrock

Minor Components

Dissimilar:

- El Descanso and Hoconuco soils, which are in positions similar to those of the majors soils but are shallow to serpentinite bedrock and have a mollic epipedon
- Cerro Gordo soils, which are very deep, have a finer textured profile than the major soils, and are on more stable landscapes

Soil Properties and Qualities

Depth class: Aljibe—shallow; Guamá—very deep; Indiera—deep

Depth to bedrock: Aljibe—25 to 40 inches; Guamá—more than 82 inches; Indiera—40 to 55 inches

Parent material: Iron-rich residuum that weathered from serpentinite bedrock

Surface runoff: High

Drainage class: Well drained

Permeability: Moderate

Available water capacity: High

Flooding: None

Hazard of water erosion: Moderate

Rock fragments in the surface layer: Less than 5 percent, by volume

Shrink-swell potential: Low

Natural fertility: Low

Content of organic matter in the surface layer: High

Reaction: Aljibe—strongly acid or moderately acid in the surface layer, moderately acid or slightly acid in the upper part of the subsoil, and slightly acid or neutral in the lower part of the subsoil; Guamá—very strongly acid to moderately acid in the surface layer, moderately acid or slightly acid in the upper part of the subsoil, and slightly acid or neutral in the lower part of the subsoil; Indiera—very strongly acid or strongly acid in the surface layer, moderately acid or slightly acid in the upper part of the subsoil, and slightly acid or neutral in the lower part of the subsoil

Land Use

Dominant uses: Forestland

Other uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Soil fertility; slope

Pasture and hayland

Suitability: Poorly suited to pasture; unsited to hayland

Commonly grown crops: Pangola grass

Management concerns: Erosion; slope; weed competition

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Slope; slippage

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.
- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by slippage.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope; slippage

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; slope; slippage

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.
- Constructing diversions across the slope improves the stability of side slopes.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: Aljibe—VIIe; Guamá—VIe; Indiera—VIIe

AtD—Altamira gravelly clay, 2 to 20 percent slopes

Setting

Landscape: Hills

Landform: Limestone hills

Major uses: Hayland, pasture, and naturalized pastureland

Elevation: 100 to 1,312 feet

Composition

Altamira and similar soils: 85 percent

Dissimilar soils: 15 percent

Typical Profile

Surface layer:

0 to 8 inches—very dark brown gravelly clay

Subsoil:

8 to 14 inches—brown clay that has masses and concretions of calcium carbonate

Substratum:

- 14 to 33 inches—very pale brown clay loam that has masses and concretions of calcium carbonate
- 33 to 43 inches—pale brown clay loam that has masses and concretions of calcium carbonate
- 43 to 54 inches—grayish brown loam that has masses and concretions of calcium carbonate
- 54 to 80 inches—very pale brown and grayish brown, stratified, soft limestone bedrock

Minor Components

Dissimilar:

- Costa soils, which have fractured limestone bedrock below a depth of 20 inches
- Pitahaya soils, which have fractured limestone bedrock at a depth of 5 to 14 inches
- La Covana soils, which have a petrocalcic horizon

Similar:

- Guayacán soils, which are in a fine-loamy family

Soil Properties and Qualities

Depth class: Deep

Depth to soft bedrock: 40 to 60 inches

Parent material: Material that weathered from soft limestone bedrock

Surface runoff: Medium

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Moderate

Rock fragments in the surface layer: 5 to 60 percent, by volume, pebbles and cobbles

Shrink-swell potential: Moderate

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Moderately alkaline or strongly alkaline throughout

Land Use

Dominant uses: Naturalized pastureland

Other uses: Hayland; pasture (fig. 8)

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Erosion; slope; very low available water capacity

Pasture and hayland

Suitability: Moderately suited

Commonly grown crops: Kleberg's bluestem

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The moderately steep slopes increase the difficulty of management.
- Including grasses and legumes in the cropping system helps to control further erosion.
- Returning crop residue to the soil helps the soil to retain moisture.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.



Figure 8.—Hayland in an area of Altamira gravelly clay, 2 to 20 percent slopes.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The moderately steep slopes increase the difficulty of management.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Moderately suited

Management concerns: Low strength; slope

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Moderately suited

Management concerns: Slope; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Moderately suited

Management concerns: Slope; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Moderately suited

Management concerns: Too clayey

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: IVc

AtF—Altamira gravelly clay, 20 to 60 percent slopes

Setting

Landscape: Hills

Landform: Limestone hills

Major uses: Naturalized pastureland and wildlife habitat

Elevation: 164 to 1,312 feet

Composition

Altamira and similar soils: 85 percent

Dissimilar soils: 15 percent

Typical Profile

Surface layer:

0 to 8 inches—very dark brown gravelly clay

Subsoil:

8 to 14 inches—brown clay that has masses and concretions of calcium carbonate

Substratum:

14 to 33 inches—very pale brown clay loam that has masses and concretions of calcium carbonate

33 to 43 inches—pale brown clay loam that has masses and concretions of calcium carbonate

43 to 54 inches—grayish brown loam that has masses and concretions of calcium carbonate

54 to 80 inches—very pale brown and grayish brown, stratified, soft limestone bedrock

Minor Components

Dissimilar:

- Costa soils, which have fractured limestone bedrock below a depth of 20 inches
- Pitahaya soils, which have fractured limestone bedrock at a depth of 5 to 14 inches
- La Covana soils, which have a petrocalcic horizon

Soil Properties and Qualities

Depth class: Deep

Depth to soft bedrock: 40 to 60 inches

Parent material: Material that weathered from soft limestone bedrock

Surface runoff: High

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Moderate to severe

Rock fragments in the surface layer: 5 to 60 percent, by volume, pebbles and cobbles

Shrink-swell potential: Moderate in the surface layer

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Moderately alkaline or strongly alkaline throughout

Land Use

Dominant uses: Wildlife habitat

Other uses: Naturalized pastureland

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Erosion; slope; very low available water capacity

Pasture and hayland

Suitability: Poorly suited to pasture; unsited to hayland

Management concerns: Erosion

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling or using the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling or using the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling or using the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: VIe

BaB—Bahía fine sand, 0 to 5 percent slopes

Setting

Landscape: Coastal plains

Landform: Coastal plains

Major uses: Wildlife habitat and urban development

Elevation: 15 to 80 feet

Composition

Bahía and similar soils: 90 percent
Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 6 inches—dark reddish brown fine sand

Subsoil:

6 to 17 inches—dark reddish brown loamy sand

17 to 26 inches—dark red sand

26 to 45 inches—dark reddish brown loamy sand

45 to 60 inches—dark reddish brown fine sandy loam

60 to 67 inches—dark reddish brown fine sandy loam

Minor Components

Dissimilar:

- Sosa soils, which have fine particle-size control sections and are in the higher positions

Similar:

- Guayabo soils, which are in positions similar to those of the Bahía soil but have mixed mineralogy

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Sandy marine deposits

Surface runoff: Negligible

Drainage class: Excessively drained

Permeability: Rapid

Available water capacity: Very low

Seasonal high water table: None within a depth of 80 inches

Flooding: None

Hazard of water erosion: Low

Rock fragments in the surface layer: Less than 2 percent, by volume

Shrink-swell potential: Low

Natural fertility: Low

Content of organic matter in the surface layer: Low

Reaction: Strongly acid or moderately acid in the surface layer and strongly acid to neutral in the subsoil

Land Use

Dominant uses: Wildlife habitat; urban development

Other uses: Cropland

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Watermelons; root crops; vegetables

Management concerns: Very low available water capacity

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.

- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Moderately suited

Commonly grown crops: Buffelgrass; hurricanegrass; Kleberg's bluestem

Management concerns: Very low available water capacity

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Moderately suited

Commonly grown crops: Buffelgrass; hurricanegrass; Kleberg's bluestem

Management concerns: Very low available water capacity

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Suited

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Poor filtering capacity

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Suited

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Too sandy

Picnic areas

Suitability: Poorly suited

Management concerns: Too sandy

Playgrounds

Suitability: Poorly suited

Management concerns: Too sandy

Paths and trails

Suitability: Poorly suited

Management concerns: Too sandy

Interpretive Group

Land capability classification: IIIs

BhB—Bahía Salinas sand, 0 to 5 percent slopes, rarely flooded

Setting

Landscape: Coastal plains

Landform: Coastal beaches

Major uses: Wildlife habitat and recreational development

Elevation: Sea level to 20 feet

Composition

Bahía Salinas and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 6 inches—brown sand that has coral and shell fragments

Underlying material:

6 to 80 inches—brown sand that has coral and shell fragments

Minor Components

Dissimilar:

- Bahía and Guayabo soils, which have finer particle-size control sections than the Bahía Salinas soil and are in higher positions

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Calcareous, sandy marine deposits

Surface runoff: Negligible

Drainage class: Excessively drained

Permeability: Very rapid

Available water capacity: Very low

Seasonal high water table: None within a depth of 80 inches

Flooding: Rare

Hazard of water erosion: Low

Rock fragments in the surface layer: Less than 15 percent, by volume, coral and shell fragments

Shrink-swell potential: Low

Natural fertility: Low

Content of organic matter in the surface layer: Low

Reaction: Slightly alkaline or moderately alkaline throughout

Land Use

Dominant uses: Wildlife habitat; recreational development

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Coconuts

Management concerns: Very low available water capacity

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.

- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Unsited

Management concerns: Very low available water capacity

Naturalized pastureland

Suitability: Unsited

Management concerns: Very low available water capacity

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Instability of cutbanks

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Poor filtering capacity

Management measures and considerations:

- If the density of the housing is moderate to high, a community sewage system is needed to prevent contamination by seepage.
- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Suited

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Too sandy

Picnic areas

Suitability: Poorly suited

Management concerns: Too sandy

Playgrounds

Suitability: Poorly suited

Management concerns: Too sandy

Paths and trails

Suitability: Poorly suited

Management concerns: Too sandy

Interpretive Group

Land capability classification: VIIIs

BjA—Bajura clay, 0 to 1 percent slopes, frequently flooded

Setting

Landscape: River valleys

Landform: Flood plains and depressions

Major uses: Pasture and wildlife habitat

Elevation: Sea level to 100 feet

Composition

Bajura and similar soils: 90 percent
Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 4 inches—very dark grayish brown clay

Subsoil:

4 to 16 inches—very dark grayish brown clay that has dark reddish brown and dark brown mottles

16 to 42 inches—very dark gray clay that has very dark gray and dark brown mottles

Underlying material:

42 to 47 inches—dark greenish gray clay that has yellowish red mottles

47 to 60 inches—black clay that has yellowish red and dark greenish gray mottles

60 to 80 inches—black clay that has dark red mottles

Minor Components

Dissimilar:

- Coloso soils, which are somewhat poorly drained and are in the higher positions
- Toa soils, which are well drained and are in the higher positions

Similar:

- Bajura-like soils that have an organic horizon below a depth of 90 inches

Soil Properties and Qualities

Depth class: Very deep

Parent material: Alluvium of mixed origin

Surface runoff: Negligible

Drainage class: Poorly drained

Permeability: Slow

Available water capacity: High

Seasonal high water table: Apparent, at a depth of $1\frac{1}{2}$ to $2\frac{1}{2}$ feet from July through September

Flooding: Frequent, brief duration

Hazard of water erosion: Slight

Shrink-swell potential: Very high

Natural fertility: High

Content of organic matter in the surface layer: Moderate to high

Reaction: Moderately acid to moderately alkaline throughout

Land Use

Dominant uses: Pasture

Other uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Sugar cane

Management concerns: Seasonal wetness; tith

Management measures and considerations:

- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland

Commonly grown crops: Carib grass; para grass

Management concerns: Seasonal wetness; tilth

Management measures and considerations:

- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Seasonal wetness

Management measures and considerations:

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Unsited

Management concerns: Seasonal wetness; shrink-swell potential; flooding

Septic tank absorption fields

Suitability: Unsited

Management concerns: Seasonal wetness; slow permeability; flooding

Local roads and streets

Suitability: Poorly suited

Management concerns: Shrink-swell potential; low strength; flooding

Management measures and considerations:

- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Unsited

Management concerns: Seasonal wetness; too clayey; flooding

Picnic areas

Suitability: Unsited

Management concerns: Seasonal wetness; too clayey; flooding

Playgrounds

Suitability: Unsited

Management concerns: Seasonal wetness; too clayey; flooding

Paths and trails

Suitability: Unsited

Management concerns: Seasonal wetness; too clayey; flooding

Interpretive Group

Land capability classification: IIIw (drained); VIIw (undrained)

BkB—Beaches, sand, 0 to 5 percent slopes

Setting

Landscape: Coastal plains

Landform: Coastal beaches

Major uses: Wildlife habitat and recreational development

Elevation: Sea level to 13 feet

Composition

This map unit is a miscellaneous land type consisting of narrow strips of nearly level to gently sloping sands along the coast of the Caribbean Sea. It commonly includes areas of limestone rock outcrop from the Oligocene epoch and cobbly surfaces along the coast. Areas of this map unit are used intensively for recreational purposes, such as sunbathing and water-related activities.

Soil Properties and Qualities

Because of the diversity of this map unit, onsite investigation is needed.

Land Use

Dominant uses: Recreational development

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Very low available water capacity

Pasture and hayland

Suitability: Unsited

Management concerns: Very low available water capacity

Naturalized pastureland

Suitability: Unsited

Management concerns: Very low available water capacity

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Instability of cutbanks; slippage; too sandy

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Poor filtering capacity; too sandy

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Unsited

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Too sandy

Picnic areas

Suitability: Poorly suited

Management concerns: Too sandy

Playgrounds

Suitability: Poorly suited

Management concerns: Too sandy

Paths and trails

Suitability: Poorly suited

Management concerns: Too sandy

Interpretive Group

Land capability classification: VIII

BmC—Bermeja-Cerro Mariquita complex, 5 to 12 percent slopes

Setting

Landscape: Hills

Landform: Ridges and hillslopes

Major uses: Naturalized pastureland

Elevation: 164 to 985 feet

Composition

Bermeja and similar soils: 70 percent

Cerro Mariquita and similar soils: 20 percent

Dissimilar soils: 10 percent

Typical Profiles

Bermeja

Surface layer:

0 to 2 inches—dark reddish brown extremely cobbly sandy loam

Subsoil:

2 to 8 inches—reddish brown extremely paragravelly sandy clay loam

Bedrock:

8 to 27 inches—red saprolite that has a texture of extremely paragravelly clay

27 inches—hard, unweathered chert bedrock

Cerro Mariquita

Surface layer:

0 to 2 inches—very dark brown gravelly clay loam

Subsoil:

2 to 13 inches—dark reddish brown extremely paragravelly clay

Bedrock:

13 to 23 inches—highly fractured, unconsolidated chert

23 inches—hard, unweathered chert bedrock

Minor Components

Dissimilar:

- Casabe soils, which are shallow to serpentinite bedrock

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: Bermeja—20 to 35 inches; Cerro Mariquita—11 to 25 inches

Soil Survey of San Germán Area, Puerto Rico

Parent material: Residuum and colluvium that weathered from basalt, chert, and rhyolite

Surface runoff: Medium

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Slight to moderate

Rock fragments in the surface layer: Bermeja—35 to 70 percent, by volume, mostly pebbles and cobbles; Cerro Mariquita—less than 65 percent, by volume, mostly pebbles and cobbles

Extent of rock outcrop: Less than 5 percent

Shrink-swell potential: Bermeja—low; Cerro Mariquita—moderate

Natural fertility: Bermeja—low; Cerro Mariquita—moderate

Content of organic matter in the surface layer: Bermeja—low; Cerro Mariquita—moderately low

Reaction: Bermeja—strongly acid to slightly acid throughout; Cerro Mariquita—slightly acid to moderately alkaline throughout

Land Use

Dominant uses: Naturalized pastureland

Other uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Depth to rock; slope

Pasture and hayland

Suitability: Moderately suited to pasture; unsited to hayland

Commonly grown crops: Buffelgrass; guineagrass

Management concerns: Depth to rock; slope

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock

Management measures and considerations:

- The use of an alternate system should be considered.
- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Bermeja—depth to rock; Cerro Mariquita—depth to rock, low strength

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Depth to rock

Management measures and considerations:

- A properly designed, alternate onsite sewage system can help to overcome the restricted depth to rock.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Suited

Management concerns: None

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Suited

Management concerns: None

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Well suited

Interpretive Group

Land capability classification: Bermeja—VIs; Cerro Mariquita—VIs

BmD—Bermeja-Cerro Mariquita complex, 12 to 20 percent slopes

Setting

Landscape: Hills and mountains

Landform: Ridges, hillslopes, and mountain slopes

Major uses: Naturalized pastureland

Elevation: 164 to 1,312 feet

Composition

Bermeja and similar soils: 70 percent

Cerro Mariquita and similar soils: 20 percent

Dissimilar soils: 10 percent

Typical Profiles

Bermeja

Surface layer:

0 to 2 inches—dark reddish brown extremely cobbly sandy loam

Subsoil:

2 to 8 inches—reddish brown extremely paragravelly sandy clay loam

Bedrock:

8 to 27 inches—red saprolite that has a texture of extremely paragravelly clay

27 inches—hard, unweathered chert bedrock

Cerro Mariquita

Surface layer:

0 to 2 inches—very dark brown gravelly clay loam

Subsoil:

2 to 13 inches—dark reddish brown extremely paragravelly clay

Bedrock:

13 to 23 inches—highly fractured, unconsolidated chert

23 inches—hard, unweathered chert bedrock

Minor Components

Dissimilar:

- Casabe soils, which are shallow to serpentinite bedrock

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: Bermeja—20 to 35 inches; Cerro Mariquita—11 to 25 inches

Parent material: Residuum and colluvium that weathered from basalt, chert, and rhyolite

Surface runoff: Medium

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Moderate

Rock fragments in the surface layer: Bermeja—35 to 70 percent, by volume, mostly pebbles and cobbles; Cerro Mariquita—less than 65 percent, by volume, mostly pebbles and cobbles

Extent of rock outcrop: Less than 5 percent

Shrink-swell potential: Bermeja—low; Cerro Mariquita—moderate

Natural fertility: Bermeja—low; Cerro Mariquita—moderate

Content of organic matter in the surface layer: Bermeja—low; Cerro Mariquita—moderately low

Reaction: Bermeja—strongly acid to slightly acid throughout; Cerro Mariquita—slightly acid to moderately alkaline throughout

Land Use

Dominant uses: Naturalized pastureland

Other uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Depth to rock; slope

Pasture and hayland

Suitability: Moderately suited to pasture; unsuited to hayland

Commonly grown crops: Buffelgrass; guineagrass

Management concerns: Depth to rock; slope

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Cutting and filling may be needed in the sloping areas.
- The use of an alternate system should be considered.
- The use of suitable fill material from an offsite location can improve system performance.
- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Bermeja—depth to rock, slope; Cerro Mariquita—depth to rock, low strength, slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Cutting and filling, designing structures to conform to the contour of the natural slope, or using the less sloping areas helps to overcome the slope limitation.

- A properly designed, alternate onsite sewage system can help to overcome the restricted depth to rock.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling or using the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: Bermeja—VIs; Cerro Mariquita—VIs

BmF—Bermeja-Cerro Mariquita complex, 20 to 60 percent slopes

Setting

Landscape: Hills and mountains

Landform: Hillslopes and mountain slopes

Major uses: Wildlife habitat

Elevation: 164 to 1,312 feet

Composition

Bermeja and similar soils: 75 percent

Cerro Mariquita and similar soils: 20 percent

Dissimilar soils: 5 percent

Typical Profiles

Bermeja

Surface layer:

0 to 2 inches—dark reddish brown extremely cobbly sandy loam

Subsoil:

2 to 8 inches—reddish brown extremely paragravelly sandy clay loam

Bedrock:

8 to 27 inches—red saprolite that has a texture of extremely paragravelly clay

27 inches—hard, unweathered chert bedrock

Cerro Mariquita

Surface layer:

0 to 2 inches—very dark brown gravelly clay loam

Subsoil:

2 to 13 inches—dark reddish brown extremely paragravelly clay

Bedrock:

13 to 23 inches—highly fractured, unconsolidated chert

23 inches—hard, unweathered chert bedrock

Minor Components

Dissimilar:

- Small areas of serpentinite rock outcrop

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: Bermeja—20 to 35 inches; Cerro Mariquita—11 to 25 inches

Parent material: Residuum and colluvium that weathered from basalt, chert, and rhyolite

Surface runoff: High

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Moderate to very severe

Rock fragments in the surface layer: Bermeja—35 to 70 percent, by volume, mostly pebbles and cobbles; Cerro Mariquita—less than 65 percent, by volume, mostly pebbles and cobbles

Extent of rock outcrop: About 5 percent

Shrink-swell potential: Bermeja—low; Cerro Mariquita—moderate

Natural fertility: Bermeja—low; Cerro Mariquita—moderate

Content of organic matter in the surface layer: Bermeja—low; Cerro Mariquita—moderately low

Reaction: Bermeja—strongly acid to slightly acid throughout; Cerro Mariquita—slightly acid to moderately alkaline throughout

Land Use

Dominant uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Depth to rock; slope

Pasture and hayland

Suitability: Unsited to pasture; unsited to hayland

Management concerns: Depth to rock; slope

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Bermeja—depth to rock, slope; Cerro Mariquita—depth to rock, low strength, slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Cutting and filling, designing structures to conform to the contour of the natural slope, or using the less sloping areas helps to overcome the slope limitation.
- A properly designed, alternate onsite sewage system can help to overcome the restricted depth to rock.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: Bermeja—VIIIs; Cerro Mariquita—VIIIs

BrF—Bermeja-Rock outcrop complex, 20 to 60 percent slopes, extremely cobbly

Setting

Landscape: Hills and mountains

Landform: Ridges, hillslopes, and mountain slopes

Major uses: Naturalized pastureland

Elevation: 328 to 987 feet

Composition

Bermeja and similar soils: 75 percent

Rock outcrop: 15 percent

Dissimilar soils: 10 percent

Typical Profiles

Bermeja

Surface layer:

0 to 2 inches—dark reddish brown extremely cobbly sandy loam

Subsoil:

2 to 8 inches—reddish brown extremely paragravelly sandy clay loam

Bedrock:

8 to 27 inches—red saprolite that has a texture of extremely paragravelly clay

27 inches—hard, unweathered chert bedrock

Rock outcrop

Bedrock:

0 to 80 inches—Basalt, chert, and rhyolite

Minor Components

Dissimilar:

- Cerro Mariquita soils, which have a clayey subsoil

Soil Properties and Qualities (Bermeja Soil)

Depth class: Shallow

Depth to bedrock: 20 to 35 inches

Parent material: Residuum and colluvium that weathered from basalt, chert, and rhyolite

Surface runoff: High

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Moderate to very severe

Rock fragments in the surface layer: 35 to 70 percent, by volume, mostly pebbles and cobbles

Extent of rock outcrop: 15 percent

Shrink-swell potential: Low

Natural fertility: Low

Content of organic matter in the surface layer: Low

Reaction: Strongly acid to slightly acid throughout

Land Use

Dominant uses: Naturalized pastureland

Other uses: Wildlife habitat

Agricultural Development (Bermeja Soil)

Cropland

Suitability: Unsited

Management concerns: Depth to rock; slope

Pasture and hayland

Suitability: Unsited

Management concerns: Depth to rock; slope

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development (Bermeja Soil)

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development (Bermeja Soil)

Camp areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or using the less sloping areas helps to overcome the slope limitation.

- Cutting and filling or using the less sloping areas helps to overcome the slope limitation.
- A properly designed, alternate onsite sewage system can help to overcome the restricted depth to rock.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling or using the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling or using the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: Bermeja—VIIIs; Rock outcrop—VIII

CaC—Cabo Rojo clay, 2 to 12 percent slopes

Setting

Landscape: Hills

Landform: Hillslopes

Major uses: Naturalized pastureland

Elevation: 50 to 165 feet

Composition

Cabo Rojo and similar soils: 100 percent

Typical Profile

Surface layer:

0 to 2 inches—very dark grayish brown clay

Subsoil:

2 to 5 inches—very dark grayish brown clay loam

5 to 19 inches—dark yellowish brown clay

19 to 26 inches—dark yellowish brown clay that has strong brown and grayish brown mottles

26 to 36 inches—brown clay loam that has red, reddish yellow, and light gray mottles

Underlying material:

36 to 72 inches—brown silty clay loam that has yellowish red, light gray, and light greenish gray mottles

Minor Components

Similar:

- Soils that are similar to the Cabo Rojo soil but have a thinner subsoil

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Fine textured colluvium from soils that formed in material weathered from volcanic bedrock

Surface runoff: Low or medium

Drainage class: Moderately well drained

Permeability: Moderate

Available water capacity: Very high

Seasonal high water table: None within a depth of 80 inches

Flooding: None

Hazard of water erosion: Low or moderate

Rock fragments in the surface layer: Less than 5 percent, by volume

Shrink-swell potential: Moderate

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate to high

Reaction: Slightly acid to strongly acid in the surface layer and subsoil and slightly acid or neutral in the underlying layer

Land Use

Dominant uses: Naturalized pastureland

Other uses: Pasture

Agricultural Development

Cropland

Suitability: Well suited

Commonly grown crops: Sugar cane

Management concerns: Slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Well suited

Commonly grown crops: African star grass; guineagrass; pangola grass

Management concerns: Slope

Management measures and considerations:

- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity during the establishment, maintenance, or renovation of hayland and pasture.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Well suited

Commonly grown crops: Guineagrass

Management concerns: Slope

Management measures and considerations:

- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity during the establishment, maintenance, or renovation of pasture.
- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Moderately suited

Management concerns: Shrink-swell potential; slope

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.
- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Slow permeability

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Paths and trails

Suitability: Poorly suited

Management concerns: Too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Interpretive Group

Land capability classification: IIIe

CbD—Caguabo clay loam, 12 to 20 percent slopes

Setting

Landscape: Hills and mountains

Landform: Hillslopes and mountain slopes

Major uses: Naturalized pastureland

Elevation: 330 to 1,640 feet

Composition

Caguabo and similar soils: 85 percent

Dissimilar soils: 15 percent

Typical Profile

Surface layer:

0 to 6 inches—dark grayish brown clay loam

Subsoil:

6 to 13 inches—brown paragravelly silty clay loam

Bedrock:

13 to 19 inches—highly fractured basalt bedrock

19 inches—hard, consolidated basalt bedrock

Minor Components

Dissimilar:

- Múcara soils, which are moderately deep to bedrock

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: 5 to 19 inches

Parent material: Residuum and colluvium that weathered from basalt bedrock

Surface runoff: Medium

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Moderate

Rock fragments in the surface layer: Less than 15 percent, by volume, mostly pebbles and cobbles

Extent of rock outcrop: Less than 5 percent

Shrink-swell potential: Low

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderately low or moderate

Reaction: Moderately acid to neutral

Land Use

Dominant uses: Naturalized pastureland

Other uses: Pasture; cropland

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Pigeonpeas

Management concerns: Depth to rock; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Moderately suited to pasture; unsuited to hayland

Commonly grown crops: Guineagrass; pangola grass

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The moderately steep slopes increase the difficulty of management.
- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The moderately steep slopes increase the difficulty of management.
- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: VIs

CbF—Caguabo clay loam, 20 to 60 percent slopes

Setting

Landscape: Hills and mountains

Landform: Hillslopes and mountain slopes (fig. 9)

Major uses: Wildlife habitat

Elevation: 500 to 2,460 feet

Composition

Caguabo and similar soils: 85 percent

Dissimilar soils: 15 percent



Figure 9.—Naturalized pastureland in an area of Caguabo clay loam, 20 to 60 percent slopes.

Typical Profile

Surface layer:

0 to 2 inches—very dark brown clay loam

Subsoil:

2 to 13 inches—dark reddish brown extremely paragravelly clay

Bedrock:

13 to 23 inches—highly fractured, unconsolidated chert

23 inches—hard, consolidated chert rock

Minor Components

Dissimilar:

- Múcara soils, which are moderately deep to bedrock
- Scattered areas of volcanic rock outcrop

Similar:

- Steeper Caguabo soils

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: 5 to 19 inches

Parent material: Residuum and colluvium that weathered from basalt bedrock

Surface runoff: Very high

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Moderate to very severe

Rock fragments in the surface layer: Less than 15 percent, by volume, mostly pebbles and cobbles

Extent of rock outcrop: Less than 10 percent

Shrink-swell potential: Low

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderately low or moderate

Reaction: Moderately acid to neutral

Land Use

Dominant uses: Wildlife habitat

Other uses: Forestland; cropland

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Pigeonpeas

Management concerns: Depth to rock; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland

Commonly grown crops: Guineagrass

Management concerns: Erosion

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Moderately suited or poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: VIIIs

CeA—Cartagena clay, 0 to 2 percent slopes

Setting

Landscape: Basins

Landform: Fan skirts

Major uses: Hayland and pasture

Elevation: 40 to 165 feet

Composition

Cartagena and similar soils: 85 percent

Dissimilar soils: 15 percent

Typical Profile

Surface layer:

0 to 7 inches—very dark grayish brown clay that has iron-manganese concretions

Subsurface layer:

7 to 15 inches—very dark grayish brown clay that has iron-manganese concretions

15 to 22 inches—very dark gray clay that has iron-manganese concretions

Subsoil:

22 to 30 inches—black clay

30 to 46 inches—dark grayish brown clay that has iron-manganese concretions

46 to 60 inches—brown clay that has iron-manganese concretions

Minor Components

Dissimilar:

- Aguirre soils, which are poorly drained and are in the lower positions

Similar:

- Fé soils, which have salt crystals in the subsoil and have smectitic mineralogy

Soil Properties and Qualities

Depth class: Very deep

Parent material: Alluvium and clayey marine sediments

Surface runoff: Low

Drainage class: Somewhat poorly drained

Permeability: Slow

Available water capacity: High

Seasonal high water table: Perched, at the surface to 1/2 foot above the surface from August through September

Flooding: None

Hazard of water erosion: Slight

Shrink-swell potential: Very high

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Neutral to moderately alkaline

Salinity: Slightly saline or moderately saline

Sodicity: Slight in the surface layer and moderate in the subsoil

Land Use

Dominant uses: Hayland

Other uses: Pasture; cropland

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Rice; sugar cane

Management concerns: Seasonal wetness; salinity; sodicity; tilth

Management measures and considerations:

- Salinity, sodicity, and seasonal wetness limit the use of this soil.
- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.

Pasture and hayland

Suitability: Moderately suited

Commonly grown crops: African star grass; buffelgrass; hurricanegrass; Kleberg's bluestem; para grass

Management concerns: Seasonal wetness; salinity; sodicity; tilth

Management measures and considerations:

- Salinity, sodicity, and seasonal wetness limit the use of this soil.
- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Seasonal wetness

Management measures and considerations:

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Unsited

Management concerns: Shrink-swell potential

Septic tank absorption fields

Suitability: Unsited

Management concerns: Wetness; restricted permeability

Local roads and streets

Suitability: Poorly suited

Management concerns: Shrink-swell potential; low strength

Management measures and considerations:

- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Moderately suited

Management concerns: Wetness; too clayey; excess salt

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Picnic areas

Suitability: Moderately suited

Management concerns: Wetness; too clayey; excess salt

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Playgrounds

Suitability: Moderately suited

Management concerns: Wetness; too clayey; excess salt

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Paths and trails

Suitability: Moderately suited

Management concerns: Too clayey

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Interpretive Group

Land capability classification: IIIc

CgD—Casabe clay, 5 to 20 percent slopes

Setting

Landscape: Hills and mountains

Landform: Ridges, hillslopes, and mountain slopes

Major uses: Urban development

Elevation: 30 to 820 feet

Composition

Casabe and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 7 inches—very dark grayish brown clay

Subsoil:

7 to 16 inches—very dark grayish brown clay

Bedrock:

16 to 38 inches—hard, fractured, moderately weathered serpentinite bedrock

38 inches—hard, fractured, consolidated serpentinite bedrock

Minor Components

Dissimilar:

- Soils that are very deep to hard, fractured, consolidated serpentinite bedrock
- Small areas of serpentinite rock outcrop

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: 9 to 17 inches

Parent material: Residuum that weathered from serpentinite bedrock

Surface runoff: High

Drainage class: Well drained

Permeability: Moderately slow

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Moderate to severe

Rock fragments in the surface layer: 5 to less than 35 percent, by volume, mostly pebbles

Extent of rock outcrop: Less than 5 percent

Shrink-swell potential: Low in the surface layer; moderate in the subsoil

Natural fertility: Moderate

Content of organic matter in the surface layer: High

Reaction: Neutral throughout

Land Use

Dominant uses: Urban development

Other uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Depth to rock; slope

Pasture and hayland

Suitability: Poorly suited to pasture; unsited to hayland

Management concerns: Depth to rock; slope

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.
- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by slippage.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.
- Constructing diversions across the slope improves the stability of side slopes.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Cutting and filling, designing structures to conform to the contour of the natural slope, or using the less sloping areas helps to overcome the slope limitation.
- A properly designed, alternate onsite sewage system can help to overcome the restricted depth to rock.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope; too clayey

Management measures and considerations:

- Establishing a suitable bed of topsoil helps to overcome the restricted depth to rock.
- Cutting and filling or using the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope; too clayey

Management measures and considerations:

- Establishing a suitable bed of topsoil helps to overcome the restricted depth to rock.
- Cutting and filling or using the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope; too clayey

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: IVs

CgF—Casabe clay, 20 to 60 percent slopes

Setting

Landscape: Hills and mountains

Landform: Hillslopes and mountain slopes

Major uses: Wildlife habitat

Elevation: 100 to 1,000 feet

Composition

Casabe and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 7 inches—very dark grayish brown clay

Subsoil:

7 to 16 inches—very dark grayish brown clay

Bedrock:

16 to 38 inches—hard, fractured, moderately weathered serpentinite bedrock

38 inches—hard, fractured, consolidated serpentinite bedrock

Minor Components

Dissimilar:

- Soils that are very deep to hard, fractured, consolidated serpentinite bedrock
- Small areas of serpentinite rock outcrop

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: 9 to 17 inches

Parent material: Residuum that weathered from serpentinite bedrock

Surface runoff: High

Drainage class: Well drained

Permeability: Moderately slow

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: 5 to less than 35 percent, by volume, mostly pebbles

Extent of rock outcrop: Less than 5 percent

Shrink-swell potential: Low in the surface layer; moderate in the subsoil

Natural fertility: Moderate

Content of organic matter in the surface layer: High

Reaction: Neutral throughout

Land Use

Dominant uses: Wildlife habitat

Other uses: Urban development

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Depth to rock; slope

Pasture and hayland

Suitability: Poorly suited to pasture; unsited to hayland

Management concerns: Depth to rock; slope

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.
- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by slippage.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.
- Constructing diversions across the slope improves the stability of side slopes.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Cutting and filling, designing structures to conform to the contour of the natural slope, or using the less sloping areas helps to overcome the slope limitation.
- A properly designed, alternate onsite sewage system can help to overcome the restricted depth to rock.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope; too clayey

Management measures and considerations:

- Establishing a suitable bed of topsoil helps to overcome the restricted depth to rock.
- Cutting and filling or using the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope; too clayey

Management measures and considerations:

- Establishing a suitable bed of topsoil helps to overcome the restricted depth to rock.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope; too clayey

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: VIIe

ChA—Cataño sand, 0 to 2 percent slopes

Setting

Landscape: Coastal plains

Landform: Coastal beaches

Major uses: Wildlife habitat and recreational development

Elevation: Sea level to 13 feet

Composition

Cataño and similar soils: 95 percent

Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 8 inches—very dark gray sand

Subsurface layer:

8 to 11 inches—very dark grayish brown coarse sand

Underlying material:

11 to 54 inches—grayish brown coarse sand

54 to 80 inches—light yellowish brown coarse sand that has cemented aggregates of filaments and threads of calcium carbonate

Minor Components

Dissimilar:

- Atolladero soils, which are poorly drained and in the lower positions
- Joyuda soils, which are very poorly drained, organic in origin, and in the lower positions

Similar:

- Areas of the Beaches miscellaneous land type, which consists of narrow strips of nearly level to gently sloping sands along the coast of the Caribbean Sea

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Beach sand deposits

Surface runoff: Negligible

Drainage class: Excessively drained

Permeability: Rapid

Available water capacity: Very low

Seasonal high water table: None within a depth of 80 inches

Flooding: None

Hazard of water erosion: Low

Rock fragments in the surface layer: Less than 15 percent, by volume, shell fragments

Shrink-swell potential: Low

Natural fertility: Low

Content of organic matter in the surface layer: Moderately low

Reaction: Moderately alkaline throughout

Land Use

Dominant uses: Wildlife habitat; recreational development

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Coconuts

Management concerns: Very low available water capacity

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Unsited

Management concerns: Very low available water capacity

Naturalized pastureland

Suitability: Unsited

Management concerns: Very low available water capacity

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Instability of cutbanks

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Poor filtering capacity

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Suited

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Too sandy

Picnic areas

Suitability: Poorly suited

Management concerns: Too sandy

Playgrounds

Suitability: Poorly suited

Management concerns: Too sandy

Paths and trails

Suitability: Poorly suited

Management concerns: Too sandy

Interpretive Group

Land capability classification: VIIIs

CjD—Cerro Gordo mucky peat, 2 to 20 percent slopes

Setting

Landscape: Serpentine mountains

Landform: Ridges

Major uses: Forestland and wildlife habitat

Elevation: 2,460 to 3,280 feet

Composition

Cerro Gordo and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 3 inches—black mucky peat

3 to 11 inches—dark reddish brown gravelly clay

Subsoil:

11 to 23 inches—dark reddish brown gravelly clay loam

23 to 40 inches—red gravelly sandy clay loam

40 to 52 inches—red gravelly sandy loam

52 to 80 inches—yellowish red gravelly sandy clay loam

Minor Components

Dissimilar:

- Indiera soils, which are moderately deep to serpentinite bedrock and are on more sloping landscapes

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Iron-rich residuum that weathered from serpentinite bedrock

Surface runoff: Low or medium

Drainage class: Well drained

Permeability: Moderate

Available water capacity: High

Flooding: None

Hazard of water erosion: Slight or low

Rock fragments in the surface layer: Less than 5 percent, by volume

Shrink-swell potential: Low

Natural fertility: Low

Content of organic matter in the surface layer: High

Reaction: Moderately acid to very strongly acid throughout

Land Use

Dominant uses: Forestland

Other uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Poorly suited

Management concerns: Soil fertility

Management measures and considerations:

- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Poorly suited

Commonly grown crops: Guineagrass; Merker grass; pangola grass; African star grass

Management concerns: Slope; weed competition

Management measures and considerations:

- The moderately steep slopes increase the difficulty of management.
- Preparing seedbeds on the contour or across the slope helps to control erosion and increases the rate of germination.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- The moderately steep slopes increase the difficulty of management.

Urban Development

Dwellings

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Suited

Management concerns: Slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; slope

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Picnic areas

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Playgrounds

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Paths and trails

Suitability: Poorly suited

Management concerns: Too clayey

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: IVs

CkD—Cerro Mariquita gravelly clay loam, 12 to 20 percent slopes

Setting

Landscape: Hills and mountains

Landform: Ridges, hillslopes, and mountain slopes

Major uses: Naturalized pastureland

Elevation: 164 to 1,312 feet

Composition

Cerro Mariquita and similar soils: 80 percent

Dissimilar soils: 20 percent

Typical Profile

Surface layer:

0 to 2 inches—very dark brown gravelly clay loam

Subsoil:

2 to 13 inches—dark reddish brown extremely paragravelly clay

Bedrock:

13 to 23 inches—highly fractured, unconsolidated chert

23 inches—hard, unweathered chert bedrock

Minor Components

Dissimilar:

- Bermeja and El Papayo soils, which do not have a clayey subsoil
- Scattered areas of volcanic rock outcrop

Similar:

- Less sloping areas of Cerro Mariquita soils

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: 11 to 25 inches

Parent material: Residuum and colluvium that weathered from basalt, chert, and rhyolite

Surface runoff: Medium

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Moderate

Rock fragments in the surface layer: Less than 65 percent, by volume, mostly pebbles and cobbles

Extent of rock outcrop: Less than 10 percent

Shrink-swell potential: Moderate

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderately low

Reaction: Slightly acid to moderately alkaline throughout

Land Use

Dominant uses: Naturalized pastureland

Other uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Depth to rock; slope

Pasture and hayland

Suitability: Moderately suited to pasture; unsited to hayland

Commonly grown crops: Buffelgrass; guineagrass

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The moderately steep slopes increase the difficulty of management.
- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The moderately steep slopes increase the difficulty of management.
- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: VIIIs

CkF—Cerro Mariquita gravelly clay loam, 20 to 60 percent slopes

Setting

Landscape: Hills and mountains

Landform: Hillslopes and mountain slopes

Major uses: Wildlife habitat

Elevation: 164 to 1,312 feet

Composition

Cerro Mariquita and similar soils: 80 percent

Dissimilar soils: 20 percent

Typical Profile

Surface layer:

0 to 2 inches—very dark brown gravelly clay loam

Subsoil:

2 to 13 inches—dark reddish brown extremely paragravelly clay

Bedrock:

13 to 23 inches—highly fractured, unconsolidated chert

23 inches—hard, unweathered chert bedrock

Minor Components

Dissimilar:

- Bermeja and El Papayo soils, which do not have a clayey subsoil
- Scattered areas of volcanic rock outcrop

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: 11 to 25 inches

Parent material: Residuum and colluvium that weathered from basalt, chert, and rhyolite

Surface runoff: High

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Moderate to very severe

Rock fragments in the surface layer: Less than 65 percent, by volume, mostly pebbles and cobbles

Extent of rock outcrop: Less than 10 percent

Shrink-swell potential: Moderate

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderately low

Reaction: Slightly acid to moderately alkaline throughout

Land Use

Dominant uses: Wildlife habitat

Other uses: Naturalized pastureland

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Depth to rock; slope

Pasture and hayland

Suitability: Unsited

Management concerns: Depth to rock; slope

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: VIIIs

CmB—Coamo clay loam, 2 to 5 percent slopes

Setting

Landscape: Coastal plains

Landform: Alluvial fans

Major uses: Naturalized pastureland

Elevation: 98 to 196 feet

Composition

Coamo and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 9 inches—black clay loam

Subsoil:

9 to 14 inches—very dark grayish brown clay loam

14 to 23 inches—dark brown clay loam

23 to 38 inches—dark yellowish brown sandy clay loam that has soft, white masses of calcium carbonate

38 to 50 inches—dark yellowish brown sandy clay loam that has soft, white masses of calcium carbonate and calcium carbonate nodules

Substratum:

50 to 60 inches—brown gravelly sandy loam

Minor Components

Dissimilar:

- Guanábano soils, which have a substratum layer at a depth of 18 to 30 inches and are in the higher positions
- Jácana soils, which have fractured, semiconsolidated volcanic rock below a depth of 20 inches and are in the higher positions

Similar:

- Steeper Coamo soils

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Mixed alluvium that weathered from limestone and volcanic rocks

Surface runoff: Low

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Moderate

Seasonal high water table: None within a depth of 80 inches

Flooding: None

Hazard of water erosion: Slight

Rock fragments in the surface layer: Less than 15 percent, by volume, pebbles

Shrink-swell potential: Moderate

Natural fertility: High

Content of organic matter in the surface layer: Moderate to high

Reaction: Slightly acid to slightly alkaline in the surface layer, slightly alkaline or moderately alkaline in the subsoil, and moderately alkaline in the substratum

Land Use

Dominant uses: Naturalized pastureland

Other uses: Urban development; recreational development

Agricultural Development

Cropland

Suitability: Moderately suited

Commonly grown crops: Cash crops; vegetables

Management concerns: Tilt; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.

Pasture and hayland

Suitability: Well suited

Commonly grown crops: African star grass; guineagrass; pangola grass

Management concerns: Tilth; weed competition

Management measures and considerations:

- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.
- Using perennial grasses and legumes in rotation helps to penetrate and breakup the clayey root zone.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Well suited

Commonly grown crops: African star grass; guineagrass; pangola grass

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Shrink-swell potential

Management measures and considerations:

- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Poor filtering capacity; restricted permeability

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Shrink-swell potential; low strength

Management measures and considerations:

- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Well suited

Picnic areas

Suitability: Well suited

Playgrounds

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Paths and trails

Suitability: Well suited

Interpretive Group

Land capability classification: IIIc

CoA—Coloso clay, 0 to 2 percent slopes, occasionally flooded

Setting

Landscape: River valleys

Landform: Flood plains

Major uses: Pasture and cropland

Elevation: Sea level to 160 feet

Composition

Coloso and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 11 inches—very dark gray clay

Subsoil:

11 to 21 inches—very dark grayish brown clay that has iron-manganese nodules

21 to 31 inches—dark grayish brown clay that has iron-manganese nodules and yellowish brown mottles

Underlying material:

31 to 46 inches—light olive brown clay that has iron-manganese nodules and yellowish brown and greenish gray mottles

46 to 75 inches—pale olive clay that has greenish gray, olive yellow, and yellowish brown mottles and black iron-manganese nodules

75 to 90 inches—grayish brown clay that has greenish gray and yellowish brown mottles and black iron-manganese nodules

Minor Components

Dissimilar:

- Bajura soils, which are poorly drained and are in the lower positions
- Toa soils, which are well drained and are in positions similar to those of the Coloso soil

Soil Properties and Qualities

Depth class: Very deep

Parent material: Stratified alluvial deposits

Surface runoff: Negligible

Drainage class: Somewhat poorly drained

Permeability: Slow

Available water capacity: High

Seasonal high water table: Apparent, at the surface to a depth of 4 feet from July through September

Flooding: Occasional, brief duration

Hazard of water erosion: Slight

Shrink-swell potential: Moderate

Natural fertility: High

Content of organic matter in the surface layer: Moderate

Reaction: Neutral to moderately alkaline

Land Use

Dominant uses: Pasture

Other uses: Cropland

Agricultural Development

Cropland

Suitability: Well suited

Commonly grown crops: Sugar cane; rice; plantains

Management concerns: Seasonal wetness; tilth

Management measures and considerations:

- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.

Pasture and hayland

Suitability: Suited

Commonly grown crops: African star grass; merker grass

Management concerns: Seasonal wetness; tilth

Management measures and considerations:

- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Suited

Management concerns: Seasonal wetness

Management measures and considerations:

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Unsited

Management concerns: Flooding

Septic tank absorption fields

Suitability: Unsited

Management concerns: Flooding; slow permeability

Local roads and streets

Suitability: Unsited

Management concerns: Low strength; seasonal wetness

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Unsited

Management concerns: Flooding; too clayey

Picnic areas

Suitability: Unsited

Management concerns: Flooding; too clayey

Playgrounds

Suitability: Unsited

Management concerns: Flooding; too clayey

Paths and trails

Suitability: Unsited

Management concerns: Too clayey

Interpretive Group

Land capability classification: IIw (drained)

CsE—Consumo clay, 20 to 40 percent slopes

Setting

Landscape: Mountain ranges

Landform: Ridges and mountain slopes

Major uses: Cropland

Elevation: 85 to 2,100 feet

Composition

Consumo and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 5 inches—strong brown clay

Subsoil:

5 to 11 inches—yellowish red clay

11 to 20 inches—yellowish red clay that has dark red mottles

Underlying material:

20 to 80 inches—mottled red, brownish yellow, and very pale brown silty clay loam

Minor Components

Dissimilar:

- Múcara soils, which do not have an argillic horizon, have a coarser textured profile than the Consumo soil, and are moderately deep to volcanic rock

Similar:

- Less sloping Consumo soils
- Humatas soils, which have a thicker subsoil than the Consumo soil

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Residuum that weathered from basic volcanic bedrock

Surface runoff: High

Drainage class: Moderately well drained

Permeability: Moderate

Available water capacity: High

Flooding: None

Hazard of water erosion: Moderate to severe

Rock fragments in the surface layer: Less than 10 percent, by volume

Shrink-swell potential: Low in the surface layer; moderate in the subsoil

Natural fertility: Low

Content of organic matter in the surface layer: Moderately low or moderate

Reaction: Slightly acid to very strongly acid

Land Use

Dominant uses: Cropland

Other uses: Forestland

Agricultural Development

Cropland

Suitability: Moderately suited

Commonly grown crops: Bananas; coffee; oranges; plantains; yams

Management concerns: Erosion; soil fertility; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.

Pasture and hayland

Suitability: Moderately suited to pasture; unsuited to hayland

Commonly grown crops: African star grass; guineagrass; pangola grass

Management concerns: Erosion; slope; weed competition

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The steep slopes increase the difficulty of management.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Biodegradable or synthetic ground covers should be used to protect eroded areas.
- Preparing seedbeds on the contour or across the slope helps to control erosion and increases the rate of germination.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The steep slopes increase the difficulty of management.
- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Slope; slippage

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.
- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by slippage.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Slippage; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; slope; slippage

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.
- Constructing diversions across the slope improves the stability of side slopes.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: VIe

CsF—Consumo clay, 40 to 60 percent slopes

Setting

Landscape: Mountain ranges

Landform: Mountain slopes

Major uses: Cropland

Elevation: 85 to 2,100 feet

Composition

Consumo and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 5 inches—strong brown clay

Subsoil:

5 to 11 inches—yellowish red clay

11 to 20 inches—yellowish red clay that has dark red mottles

Underlying material:

20 to 80 inches—mottled red, brownish yellow, and very pale brown silty clay loam

Minor Components

Dissimilar:

- Múcara soils, which do not have an argillic horizon, have a coarser textured profile than the Consumo soil, and are moderately deep to volcanic rock
- Caguabo soils, which do not have an argillic horizon, have a coarser textured profile than the Consumo soil, and are shallow to volcanic rock

Similar:

- Humatas soils, which have a thicker subsoil than the Consumo soil

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Residuum that weathered from basic volcanic bedrock

Surface runoff: High

Drainage class: Moderately well drained

Permeability: Moderate

Available water capacity: High

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: Less than 10 percent, by volume

Shrink-swell potential: Low in the surface layer; moderate in the subsoil

Natural fertility: Low

Content of organic matter in the surface layer: Moderately low or moderate

Reaction: Slightly acid to very strongly acid

Land Use

Dominant uses: Cropland

Other uses: Forestland

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Bananas; coffee; oranges; plantains

Management concerns: Erosion; soil fertility; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland

Commonly grown crops: African star grass; pangola grass

Management concerns: Erosion; weed control

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Biodegradable or synthetic ground covers should be used to protect eroded areas.
- Preparing seedbeds on the contour or across the slope helps to control erosion and increases the rate of germination.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Erosion

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Slope; slippage

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.
- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by slippage.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Slippage; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; slope; slippage

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.
- Constructing diversions across the slope improves the stability of side slopes.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: VIIe

**CtA—Cortada silty clay loam, 0 to 2 percent slopes,
occasionally flooded**

Setting

Landscape: River valleys

Landform: Flood plains

Major uses: Cropland

Elevation: Sea level to 165 feet

Composition

Cortada and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 6 inches—very dark gray silty clay loam

Subsurface layer:

6 to 15 inches—very dark brown silty clay loam

Subsoil:

15 to 23 inches—very dark grayish brown silty clay loam that has very pale brown masses of calcium carbonate

23 to 34 inches—very dark grayish brown clay loam that has very pale brown masses of calcium carbonate

34 to 45 inches—very dark grayish brown sandy clay loam that has very pale brown masses of calcium carbonate

Underlying material:

45 to 56 inches—dark gray sandy loam

56 to 63 inches—dark gray loam

63 to 80 inches—dark gray gravelly sandy clay loam

Minor Components

Dissimilar:

- Vayas soils, which are poorly drained and are in the lower positions

Similar:

- San Antón soils, which are in positions similar to those of the Cortada soil but do not have masses of calcium carbonate in the subsoil

Soil Properties and Qualities

Depth class: Very deep

Parent material: Stratified alluvial deposits

Surface runoff: Negligible

Drainage class: Well drained
Permeability: Moderate
Available water capacity: Moderate
Seasonal high water table: None within a depth of 6 feet
Flooding: Occasional, brief duration
Hazard of water erosion: Slight
Shrink-swell potential: Low
Natural fertility: High
Content of organic matter in the surface layer: High
Reaction: Slightly alkaline in the surface and subsurface layers and moderately alkaline in the subsoil and substratum

Land Use

Dominant uses: Cropland
Other uses: Naturalized pastureland

Agricultural Development

Cropland

Suitability: Well suited
Commonly grown crops: Bananas; plantains; cash crops
Management concerns: Seasonal wetness
Management measures and considerations:

- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.

Pasture and hayland

Suitability: Well suited
Commonly grown crops: Kleberg's bluestem; hurricanegrass
Management concerns: Seasonal wetness
Management measures and considerations:

- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Well suited
Management concerns: Seasonal wetness
Management measures and considerations:

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Unsited
Management concerns: Flooding

Septic tank absorption fields

Suitability: Unsited
Management concerns: Flooding

Local roads and streets

Suitability: Unsited
Management concerns: Low strength; flooding
Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Unsited

Management concerns: Flooding

Picnic areas

Suitability: Suited

Management concerns: None

Playgrounds

Suitability: Moderately suited

Management concerns: Flooding

Paths and trails

Suitability: Suited

Management concerns: None

Interpretive Group

Land capability classification: IIc

CuD—Costa-Pitahaya complex, 5 to 20 percent slopes

Setting

Landscape: Hills

Landform: Ridges and hillslopes

Major uses: Naturalized pastureland

Elevation: 80 to 575 feet

Composition

Costa and similar soils: 70 percent

Pitahaya and similar soils: 25 percent

Dissimilar soils: 5 percent

Typical Profiles

Costa

Surface layer:

0 to 7 inches—dark yellowish brown very gravelly clay

Subsurface layer:

7 to 11 inches—dark yellowish brown very gravelly clay that has soft masses and concretions of calcium carbonate

Substratum:

11 to 19 inches—light yellowish brown silty clay

Bedrock:

19 to 27 inches—light yellowish brown, soft, semiconsolidated, fractured limestone that has a texture of silty clay

27 to 43 inches—yellow and very pale brown, soft, semiconsolidated, fractured limestone that has a texture of loam

43 to 63 inches—very pale brown, consolidated limestone bedrock

Pitahaya

Surface layer:

0 to 2 inches—dark brown gravelly clay

Subsurface layer:

2 to 11 inches—brown extremely gravelly clay

Bedrock:

11 to 27 inches—very pale brown, hard, semiconsolidated, fractured limestone

27 to 80 inches—very pale brown, hard, consolidated limestone bedrock

Minor Components

Dissimilar:

- Altamira soils, which are in positions similar to those of the Costa and Pitahaya soils but are deep to limestone bedrock

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: Costa—10 to 20 inches; Pitahaya—5 to 20 inches

Parent material: Residuum and colluvium that weathered from limestone bedrock

Surface runoff: Very high

Drainage class: Well drained

Permeability: Very slow

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: Costa—15 to 60 percent, by volume, pebbles and cobbles; Pitahaya—5 to 60 percent, by volume, pebbles and cobbles

Extent of rock outcrop: Less than 5 percent

Shrink-swell potential: Low

Natural fertility: Low

Content of organic matter in the surface layer: Moderate to high

Reaction: Costa—slightly alkaline or moderately alkaline; Pitahaya—moderately alkaline

Land Use

Dominant uses: Naturalized pastureland

Other uses: Urban development

Agricultural Development

Cropland

Suitability: Poorly suited

Management concerns: Very low available water capacity; depth to rock; slope

Pasture and hayland

Suitability: Moderately suited to pasture; unsuited to hayland

Commonly grown crops: Hurricanegrass; Kleberg's bluestem

Management concerns: Very low available water capacity; depth to rock; slope

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Very low available water capacity; depth to rock; slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope; slippage

Management measures and considerations:

- Cutting and filling may be needed in the more sloping areas.
- The use of an alternate system should be considered.
- The use of suitable fill material from an offsite location can improve system performance.
- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope; small stones

Management measures and considerations:

- Cutting and filling, designing structures to conform to the contour of the natural slope, or using the less sloping areas helps to overcome the slope limitation.
- A properly designed, alternate onsite sewage system can help to overcome the restricted depth to rock.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope; small stones

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope; small stones

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: Costa—Vlc; Pitahaya—Vlc

CuF—Costa-Pitahaya complex, 20 to 60 percent slopes

Setting

Landscape: Hills

Landform: Hillslopes

Major uses: Wildlife habitat

Elevation: 80 to 575 feet

Composition

Costa and similar soils: 70 percent

Pitahaya and similar soils: 25 percent

Dissimilar soils: 5 percent

Typical Profiles

Costa

Surface layer:

0 to 7 inches—dark yellowish brown very gravelly clay

Subsurface layer:

7 to 11 inches—dark yellowish brown very gravelly clay that has soft masses and concretions of calcium carbonate

Substratum:

11 to 19 inches—light yellowish brown silty clay

Bedrock:

19 to 27 inches—light yellowish brown, soft, semiconsolidated, fractured limestone that has a texture of silty clay

27 to 43 inches—yellow and very pale brown, soft, semiconsolidated, fractured limestone that has a texture of loam

43 to 63 inches—very pale brown, consolidated limestone bedrock

Pitahaya

Surface layer:

0 to 2 inches—dark brown gravelly clay

Subsurface layer:

2 to 11 inches—brown extremely gravelly clay

Bedrock:

11 to 27 inches—very pale brown, hard, semiconsolidated, fractured limestone

27 to 80 inches—very pale brown, hard, consolidated limestone bedrock

Minor Components

Dissimilar:

- Altamira soils, which are in positions similar to those of the Costa and Pitahaya soils but are deep to limestone bedrock

Similar:

- Costa and Pitahaya soils that have slopes of 60 to 90 percent

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: Costa—10 to 20 inches; Pitahaya—5 to 20 inches

Parent material: Residuum and colluvium that weathered from limestone bedrock

Surface runoff: Very high

Drainage class: Well drained

Permeability: Very slow

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Severe or very severe

Rock fragments in the surface layer: Costa—15 to 60 percent, by volume, pebbles and cobbles; Pitahaya—5 to 60 percent, by volume, pebbles and cobbles

Extent of rock outcrop: Less than 10 percent

Shrink-swell potential: Low

Natural fertility: Low

Content of organic matter in the surface layer: Moderate to high

Reaction: Costa—slightly alkaline or moderately alkaline; Pitahaya—moderately alkaline

Land Use

Dominant uses: Wildlife habitat

Other uses: Urban development

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Very low available water capacity; depth to rock; slope

Pasture and hayland

Suitability: Poorly suited to pasture; unsited to hayland

Commonly grown crops: Hurricanegrass; Kleberg's bluestem

Management concerns: Very low available water capacity; depth to rock; slope

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Very low available water capacity; depth to rock; slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope; slippage

Management measures and considerations:

- Cutting and filling may be needed in the more sloping areas.
- The use of an alternate system should be considered.
- The use of suitable fill material from an offsite location can improve system performance.
- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited or unsuited

Management concerns: Depth to rock; slope; small stones

Management measures and considerations:

- Cutting and filling, designing structures to conform to the contour of the natural slope, or using the less sloping areas helps to overcome the slope limitation.
- A properly designed, alternate onsite sewage system can help to overcome the restricted depth to rock.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited or unsuited

Management concerns: Slope; small stones

Management measures and considerations:

- Cutting and filling or using the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited or unsuited

Management concerns: Slope; small stones

Management measures and considerations:

- Cutting and filling or using the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: Costa—VIIc Pitahaya—VIIc

CvF—Cuchillas silty clay loam, 20 to 60 percent slopes

Setting

Landscape: Mountain ranges
Landform: Ridges and mountain slopes
Major uses: Cropland and forestland
Elevation: 2,460 to 3,609 feet

Composition

Cuchillas and similar soils: 80 percent
Dissimilar soils: 20 percent

Typical Profile

Surface layer:
0 to 6 inches—very dark grayish brown silty clay loam
Subsoil:
6 to 15 inches—dark grayish brown silty clay loam
Bedrock:
15 to 36 inches—highly fractured, unconsolidated volcanic rock
36 inches—hard fractured, consolidated volcanic rock

Minor Components

Dissimilar:

- Maricao soils, which have a solum that is 15 to 25 inches thick and have a finer textured profile than the Cuchillas soil
- Scattered areas of volcanic rock outcrop

Soil Properties and Qualities

Depth class: Moderately deep
Depth to bedrock: 28 to 36 inches
Parent material: Residuum that weathered from volcanic rocks
Surface runoff: High
Drainage class: Well drained
Permeability: Moderate
Available water capacity: Moderate
Flooding: None
Hazard of water erosion: Moderate to severe
Rock fragments in the surface layer: Less than 15 percent, by volume, cobbles and stones
Extent of rock outcrop: Less than 15 percent
Shrink-swell potential: Moderate
Natural fertility: Moderate
Content of organic matter in the surface layer: Moderate to high
Reaction: Slightly acid or neutral

Land Use

Dominant uses: Cropland
Other uses: Forestland

Agricultural Development

Cropland
Suitability: Poorly suited
Commonly grown crops: Coffee; oranges
Management concerns: Erosion; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland

Commonly grown crops: African star grass; guineagrass; pangola grass

Management concerns: Erosion; slope; weed control

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The steep and very steep slopes increase the difficulty of management.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Preparing seedbeds on the contour or across the slope helps to control erosion and increases the rate of germination.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The steep and very steep slopes increase the difficulty of management.
- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Moderately suited or poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: VIIe

CvG—Cuchillas silty clay loam, 60 to 90 percent slopes

Setting

Landscape: Mountain ranges

Landform: Mountain slopes

Major uses: Wildlife habitat and forestland

Elevation: 2,460 to 3,609 feet

Composition

Cuchillas and similar soils: 80 percent

Dissimilar soils: 20 percent

Typical Profile

Surface layer:

0 to 6 inches—very dark grayish brown silty clay loam

Subsoil:

6 to 15 inches—dark grayish brown silty clay loam

Bedrock:

15 to 36 inches—highly fractured, unconsolidated volcanic rock

36 inches—hard fractured, consolidated volcanic rock

Minor Components

Dissimilar:

- Maricao soils, which have a solum that is 15 to 25 inches thick and have a finer textured profile than the Cuchillas soil
- Scattered areas of volcanic rock outcrop

Soil Properties and Qualities

Depth class: Moderately deep

Depth to bedrock: 28 to 36 inches

Parent material: Residuum that weathered from volcanic rocks

Surface runoff: Very high

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Moderate

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: Less than 15 percent, by volume, cobbles and stones

Extent of rock outcrop: Less than 15 percent

Shrink-swell potential: Moderate

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate to high

Reaction: Slightly acid or neutral

Land Use

Dominant uses: Wildlife habitat

Other uses: Forestland

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Erosion; slope

Pasture and hayland

Suitability: Unsited

Management concerns: Erosion; slope

Naturalized pastureland

Suitability: Unsited

Management concerns: Erosion; slope

Urban Development

Dwellings

Suitability: Unsited

Management concerns: Slope

Septic tank absorption fields

Suitability: Unsited

Management concerns: Slope; depth to rock

Local roads and streets

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A properly designed road drainage system that includes carefully located culverts and gutters helps to control erosion.
- Road cuts can expose a large amount of fractured bedrock, which is subject to slumping.
- Cut slopes are subject to slumping where rock layers are parallel to the slope.

Recreational Development

Camp areas

Suitability: Unsited

Management concerns: Slope

Picnic areas

Suitability: Unsited

Management concerns: Slope

Playgrounds

Suitability: Unsited

Management concerns: Slope

Paths and trails

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: Vlle

DeD—Delicias clay, 5 to 20 percent slopes

Setting

Landscape: Uplands

Landform: Alluvial fans

Major uses: Naturalized pastureland

Elevation: 164 to 262 feet

Composition

Delicias and similar soils: 95 percent

Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 6 inches—dark reddish brown clay that has ironstone pebbles

Subsoil:

6 to 14 inches—dark reddish brown gravelly clay that has ironstone pebbles

14 to 21 inches—dark reddish brown gravelly clay that has ironstone pebbles

21 to 36 inches—dark reddish brown very gravelly clay that has ironstone pebbles

36 to 47 inches—dark red gravelly clay that has ironstone pebbles

47 to 68 inches—dark red clay that has ironstone pebbles

Minor Components

Similar:

- Nipe soils, which have a finer textured profile than the Delicias soil and are in higher positions

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Fine-textured colluvium and residuum that weathered from serpentinite bedrock

Surface runoff: Medium

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Moderate

Flooding: None

Hazard of water erosion: Moderate

Rock fragments in the surface layer: 0 to less than 35 percent, by volume, ironstone pebbles

Shrink-swell potential: Moderate

Natural fertility: Low

Content of organic matter in the surface layer: Moderately low to high

Reaction: Moderately acid to very strongly acid

Land Use

Dominant uses: Naturalized pastureland; urban development

Other uses: Pasture

Agricultural Development

Cropland

Suitability: Moderately suited

Commonly grown crops: Sugar cane

Management concerns: Erosion; soil fertility; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Well suited to pasture; moderately suited to hayland

Commonly grown crops: African star grass; guineagrass; pangola grass

Management concerns: Erosion; slope; weed control

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The moderately steep slopes increase the difficulty of management.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Preparing seedbeds on the contour or across the slope helps to control erosion and increases the rate of germination.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Well suited

Commonly grown crops: African star grass; guineagrass; pangola grass

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The moderately steep slopes increase the difficulty of management.
- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Moderately suited or poorly suited

Management concerns: Slope; shrink-swell potential

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.
- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately suited or poorly suited

Management concerns: Permeability; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; slope

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Moderately suited or poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Moderately suited or poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Moderately suited or poorly suited

Management concerns: Too clayey; slope; small stones

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Moderately suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: IIIe

DqA—Dique loam, 0 to 2 percent slopes, frequently flooded

Setting

Landscape: River valleys

Landform: Flood plains

Major uses: Pasture

Elevation: 30 to 100 feet

Composition

Dique and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 12 inches—olive brown loam

Subsoil:

12 to 25 inches—olive brown loam

25 to 37 inches—olive brown silt loam

Underlying material:

37 to 56 inches—olive brown loam that has yellowish red masses of iron concentration

56 to 69 inches—very dark gray clay that has common fine prominent yellowish red mottles

69 to 90 inches—mottled light olive brown, dark grayish brown, and gray silty clay loam

Minor Components

Dissimilar:

- Toa soils, which are in positions similar to those of the Dique soil but have a finer textured profile
- Bajura and Coloso soils, which are on the lower landscapes and are poorly and somewhat poorly drained, respectively.
- Reilly soils, which are in positions similar to those of the Dique soil but have a coarser textured profile

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 90 inches

Soil Survey of San Germán Area, Puerto Rico

Parent material: Alluvial deposits of mixed origin

Surface runoff: Negligible

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Moderate

Seasonal high water table: None within a depth of 6 feet

Flooding: Frequent, very brief duration

Hazard of water erosion: Slight

Rock fragments in the surface layer: Less than 15 percent, by volume, pebbles

Shrink-swell potential: Low

Natural fertility: High

Content of organic matter in the surface layer: Moderately low or moderate

Reaction: Neutral to slightly alkaline throughout

Land Use

Dominant uses: Pasture

Other uses: Cropland

Agricultural Development

Cropland

Suitability: Suited

Commonly grown crops: Sugar cane

Management concerns: Seasonal wetness

Management measures and considerations:

- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.

Pasture and hayland

Suitability: Suited to pasture; moderately suited to hayland

Commonly grown crops: African star grass; merker grass; pangola grass

Management concerns: Seasonal wetness

Management measures and considerations:

- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Suited

Commonly grown crops: African star grass; merker grass; pangola grass

Management concerns: Seasonal wetness

Management measures and considerations:

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Unsited

Management concerns: Flooding

Septic tank absorption fields

Suitability: Unsited

Management concerns: Flooding

Local roads and streets

Suitability: Unsited

Management concerns: Flooding; low strength

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Flooding

Picnic areas

Suitability: Moderately suited

Management concerns: Seasonal flooding

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can raise the area above the flooding.

Playgrounds

Suitability: Moderately suited

Management concerns: Seasonal flooding

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can raise the area above the flooding.

Paths and trails

Suitability: Moderately suited

Management concerns: Seasonal flooding

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can raise the area above the flooding.

Interpretive Group

Land capability classification: IIIw

DsC—Descalabrado clay, 2 to 12 percent slopes

Setting

Landscape: Hills

Landform: Volcanic hillslopes

Major uses: Naturalized pastureland

Elevation: 98 to 985 feet

Composition

Descalabrado and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 5 inches—dark brown clay

Subsoil:

5 to 10 inches—dark brown clay

Bedrock:

10 to 18 inches—highly fractured, unconsolidated volcanic rock

18 inches—hard, consolidated volcanic rock

Minor Components

Dissimilar:

- Jácana soils, which have fractured, semiconsolidated volcanic rock below a depth of 20 inches and are in the lower positions

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: 10 to 20 inches

Parent material: Residuum and colluvium that weathered from basic volcanic rock

Surface runoff: Medium

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Low

Rock fragments in the surface layer: Less than 35 percent, by volume, pebbles

Shrink-swell potential: High in the surface layer

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Slightly acid or neutral

Land Use

Dominant uses: Naturalized pastureland

Other uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Pigeonpeas

Management concerns: Depth to rock; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, contour stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.

Pasture and hayland

Suitability: Moderately suited

Commonly grown crops: Hurricanegrass; Kleberg's bluestem

Management concerns: Erosion; slope; weed control

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The moderately steep slopes increase the difficulty of management.
- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Mechanical and chemical means can be used to help control competition from weeds.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Erosion; slope; weed control

Management measures and considerations:

- Erosion is a concern in unprotected areas.

- The moderately steep slopes increase the difficulty of management.
- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock; shrink-swell potential

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Depth to rock; low strength; shrink-swell potential

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Depth to rock; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Well suited

Interpretive Group

Land capability classification: IVs

DsD—Descalabrado clay, 12 to 20 percent slopes

Setting

Landscape: Hills

Landform: Volcanic hillslopes

Major uses: Naturalized pastureland and forestland

Elevation: 98 to 985 feet

Composition

Descalabrado and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 5 inches—dark brown clay

Subsoil:

5 to 10 inches—dark brown clay

Bedrock:

10 to 18 inches—highly fractured, unconsolidated volcanic rock

18 inches—hard, consolidated volcanic rock

Minor Components

Dissimilar:

- Jácana soils, which have fractured, semiconsolidated volcanic rock below a depth of 20 inches deep and are in the lower, less sloping positions

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: 10 to 20 inches

Parent material: Residuum and colluvium that weathered from basic volcanic rock

Surface runoff: Medium

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Moderate to severe

Rock fragments in the surface layer: Less than 35 percent, by volume, pebbles

Shrink-swell potential: High in the surface layer

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Slightly acid or neutral

Land Use

Dominant uses: Naturalized pastureland

Other uses: Forestland; wildlife habitat

Agricultural Development

Cropland

Suitability: Poorly suited or unsuited

Commonly grown crops: Pigeonpeas

Management concerns: Depth to rock; slope

Pasture and hayland

Suitability: Moderately suited to pasture; unsuited to hayland

Commonly grown crops: Hurricanegrass; Kleberg's bluestem

Management concerns: Depth to rock; slope

Management measures and considerations:

- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock; shrink-swell potential; slope

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Depth to rock; low strength; shrink-swell potential; slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: VIs

DsF—Descalabrado clay, 20 to 60 percent slopes

Setting

Landscape: Hills

Landform: Volcanic hillslopes

Major uses: Wildlife habitat

Elevation: 98 to 985 feet

Composition

Descalabrado and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 5 inches—dark brown clay

Subsoil:

5 to 10 inches—dark brown clay

Bedrock:

10 to 18 inches—highly fractured, unconsolidated volcanic rock

18 inches—hard, consolidated volcanic rock

Minor Components

Dissimilar:

- San Germán soils, which are shallow to fractured limestone bedrock
- Scattered areas of volcanic rock outcrop

Similar:

- Scattered areas of less sloping Descalabrado soils

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: 10 to 20 inches

Parent material: Residuum and colluvium that weathered from basic volcanic rock

Surface runoff: High

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Severe or very severe

Rock fragments in the surface layer: Less than 35 percent, by volume, pebbles

Extent of rock outcrop: Less than 10 percent

Shrink-swell potential: High in the surface layer

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Slightly acid or neutral

Land Use

Dominant uses: Wildlife habitat

Other uses: Forestland

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Depth to rock; slope

Pasture and hayland

Suitability: Poorly suited to pasture; unsited to hayland

Management concerns: Depth to rock; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock; shrink-swell potential; slope

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Depth to rock; low strength; shrink-swell potential; slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: VIIIs

EcD—El Cacique-La Taína complex, 5 to 20 percent slopes

Setting

Landscape: Hills and mountains

Landform: Ridges, hillslopes, and mountain slopes

Major uses: Wildlife habitat

Elevation: 164 to 2,130 feet

Composition

El Cacique and similar soils: 60 percent
La Taína and similar soils: 30 percent
Dissimilar soils: 10 percent

Typical Profiles

El Cacique

Surface layer:

0 to 6 inches—very dark grayish brown gravelly clay loam

Subsoil:

6 to 11 inches—very dark grayish brown very paragravelly clay

Bedrock:

11 to 14 inches—highly fractured serpentinite bedrock

14 to 86 inches—hard, consolidated serpentinite bedrock

La Taína

Surface layer:

0 to 8 inches—very dark brown very gravelly clay

Subsoil:

8 to 13 inches—dark reddish brown extremely gravelly clay

13 to 17 inches—dark reddish brown extremely paragravelly clay loam

Bedrock:

17 to 29 inches—highly fractured, unconsolidated serpentinite bedrock

29 inches—hard, consolidated serpentinite bedrock

Minor Components

Dissimilar:

- Maresú soils, which are moderately deep to fractured serpentinite bedrock

Similar:

- Less sloping El Cacique and La Taína soils

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: El Cacique—9 to 16 inches; La Taína—11 to 20 inches

Parent material: Residuum and colluvium that weathered from serpentinite bedrock

Surface runoff: Very high

Drainage class: Well drained

Permeability: Moderately slow

Available water capacity: Low

Flooding: None

Hazard of water erosion: Moderate to severe

Rock fragments in the surface layer: El Cacique—5 to 40 percent, by volume, mostly pebbles; La Taína—8 to 65 percent, by volume, mostly pebbles and cobbles

Extent of rock outcrop: Less than 5 percent

Shrink-swell potential: Low in the surface layer; moderate in the subsoil

Natural fertility: Moderate

Content of organic matter in the surface layer: High

Reaction: Neutral throughout

Land Use

Dominant uses: Wildlife habitat

Other uses: Forestland

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Depth to rock; slope

Pasture and hayland

Suitability: Moderately suited to pasture; unsited to hayland

Commonly grown crops: Hurricanegrass; Kleberg's bluestem

Management concerns: Depth to rock; slope

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock; slope; slippage

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.
- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by slippage.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: El Cacique—depth to rock, low strength, shrink-swell potential, slope; La Taína—depth to rock, slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.
- Constructing diversions across the slope improves the stability of side slopes.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Depth to rock; slow permeability; slope

Management measures and considerations:

- Cutting and filling, designing structures to conform to the contour of the natural slope, or using the less sloping areas helps to overcome the slope limitation.
- A properly designed, alternate onsite sewage system can help to overcome the restricted depth to rock.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Depth to rock; slow permeability; slope

Management measures and considerations:

- Establishing a suitable bed of topsoil helps to overcome the restricted depth to rock.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Establishing a suitable bed of topsoil helps to overcome the restricted depth to rock.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: El Cacique—suited; La Taína—poorly suited

Management concerns: La Taína—too clayey

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: El Cacique—IVs; La Taína—IVs

EcF—El Cacique-La Taína complex, 20 to 60 percent slopes

Setting

Landscape: Hills and mountains

Landform: Hillslopes and mountain slopes

Major uses: Wildlife habitat

Elevation: 164 to 2,130 feet

Composition

El Cacique and similar soils: 60 percent

La Taína and similar soils: 30 percent

Dissimilar soils: 10 percent

Typical Profiles

El Cacique

Surface layer:

0 to 6 inches—very dark grayish brown gravelly clay loam

Subsoil:

6 to 11 inches—very dark grayish brown very paragravelly clay

Bedrock:

11 to 14 inches—highly fractured, serpentinite bedrock

14 to 86 inches—hard, consolidated serpentinite bedrock

La Taína

Surface layer:

0 to 8 inches—very dark brown very gravelly clay

Subsoil:

8 to 13 inches—dark reddish brown extremely gravelly clay

13 to 17 inches—dark reddish brown extremely paragravelly clay loam

Bedrock:

17 to 29 inches—highly fractured, unconsolidated serpentinite bedrock

29 inches—hard, consolidated serpentinite bedrock

Minor Components

Dissimilar:

- Maresúa soils, which are moderately deep to fractured serpentinite bedrock
- Scattered areas of serpentinite rock outcrop

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: El Cacique—9 to 16 inches; La Taína—11 to 20 inches

Parent material: Residuum and colluvium that weathered from serpentinite bedrock

Surface runoff: Very high

Drainage class: Well drained

Permeability: Moderately slow

Available water capacity: Low

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: El Cacique—5 to 40 percent, by volume, mostly pebbles; La Taína—8 to 65 percent, by volume, mostly pebbles and cobbles

Extent of rock outcrop: Less than 10 percent

Shrink-swell potential: Low in the surface layer; moderate in the subsoil

Natural fertility: Moderate

Content of organic matter in the surface layer: High

Reaction: Neutral throughout

Land Use

Dominant uses: Wildlife habitat

Other uses: Forestland (fig. 10)

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Depth to rock; slope



Figure 10.—Forestland in an area of El Cacique-La Taína complex, 20 to 60 percent slopes. El Cacique and La Taína soils are subject to slippage.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland

Commonly grown crops: Hurricanegrass; Kleberg's bluestem

Management concerns: Depth to rock; slope

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock; slope; slippage

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by slippage.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: El Cacique—depth to rock, slope, low strength, shrink-swell potential; La Taína—depth to rock, slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.
- Constructing diversions across the slope improves the stability of side slopes.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Depth to rock; slow permeability; slope

Management measures and considerations:

- Cutting and filling, designing structures to conform to the contour of the natural slope, or using the less sloping areas helps to overcome the slope limitation.
- A properly designed, alternate onsite sewage system can help to overcome the restricted depth to rock.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Depth to rock; slow permeability; slope

Management measures and considerations:

- Establishing a suitable bed of topsoil helps to overcome the restricted depth to rock.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Establishing a suitable bed of topsoil helps to overcome the restricted depth to rock.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope; too clayey

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: El Cacique—VIs; La Taína—VIs

EcG—El Cacique-La Taína complex, 60 to 90 percent slopes

Setting

Landscape: Mountains

Landform: Mountain slopes

Major uses: Wildlife habitat

Elevation: 500 to 2,130 feet

Composition

El Cacique and similar soils: 60 percent

La Taína and similar soils: 30 percent

Dissimilar soils: 10 percent

Typical Profiles

El Cacique

Surface layer:

0 to 6 inches—very dark grayish brown gravelly clay loam

Subsoil:

6 to 11 inches—very dark grayish brown very paragravelly clay

Bedrock:

11 to 14 inches—highly fractured serpentinite bedrock

14 to 86 inches—hard, consolidated serpentinite bedrock

La Taína

Surface layer:

0 to 8 inches—very dark brown very gravelly clay

Subsoil:

8 to 13 inches—dark reddish brown extremely gravelly clay

13 to 17 inches—dark reddish brown extremely paragravelly clay loam

Bedrock:

17 to 29 inches—highly fractured, unconsolidated serpentinite bedrock

29 inches—hard, consolidated serpentinite bedrock

Minor Components

Dissimilar:

- Maresúa soils, which are moderately deep to fractured serpentinite bedrock
- Scattered areas of serpentinite rock outcrop

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: El Cacique—9 to 16 inches; La Taína—11 to 20 inches

Parent material: Residuum and colluvium that weathered from serpentinite bedrock

Surface runoff: Very high

Drainage class: Well drained

Permeability: Moderately slow

Available water capacity: Low

Flooding: None

Hazard of water erosion: Very severe

Rock fragments in the surface layer: El Cacique—5 to 40 percent, by volume, mostly pebbles; La Taína—8 to 65 percent, by volume, mostly pebbles and cobbles

Extent of rock outcrop: Less than 10 percent

Shrink-swell potential: Low in the surface layer; moderate in the subsoil

Natural fertility: Moderate

Content of organic matter in the surface layer: High

Reaction: Neutral throughout

Land Use

Dominant uses: Wildlife habitat

Other uses: Forestland

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Depth to rock; slope

Pasture and hayland

Suitability: Unsited

Management concerns: Depth to rock; slope

Naturalized pastureland

Suitability: Unsited

Management concerns: Depth to rock; slope

Urban Development

Dwellings

Suitability: Unsited

Management concerns: Depth to rock; slope; slippage

Septic tank absorption fields

Suitability: Unsited

Management concerns: Depth to rock; slope

Local roads and streets

Suitability: Poorly suited

Management concerns: El Cacique—depth to rock, slope, low strength, shrink-swell potential; La Taína—depth to rock, slope, slippage

Management measures and considerations:

- A properly designed road drainage system that includes carefully located culverts and gutters helps to control erosion.
- Road cuts can expose a large amount of fractured bedrock, which is subject to slumping.
- Cut slopes are subject to slumping where rock layers are parallel to the slope.

Recreational Development

Camp areas

Suitability: Unsited

Management concerns: Slope

Picnic areas

Suitability: Unsited

Management concerns: Slope

Playgrounds

Suitability: Unsited

Management concerns: Slope

Paths and trails

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: El Cacique—VIIe; La Taína—VIIe

EdD—El Descanso-Hoconuco complex, 5 to 20 percent slopes

Setting

Landscape: Serpentinite mountains

Landform: Ridges and mountain slopes

Major uses: Forestland and wildlife habitat

Elevation: 2,460 to 3,280 feet

Composition

El Descanso and similar soils: 50 percent

Hoconuco and similar soils: 45 percent

Dissimilar soils: 5 percent

Typical Profiles

El Descanso

Surface layer:

0 to 3 inches—black mucky peat

3 to 8 inches—dark brown very gravelly clay loam

Subsoil:

8 to 15 inches—dark brown extremely paragravelly clay

Bedrock:

15 inches—hard, fractured, consolidated serpentinite bedrock

Hoconuco

Surface layer:

0 to 3 inches—very dark brown mucky peat

3 to 7 inches—dark brown gravelly clay loam

Subsoil:

7 to 14 inches—dark reddish brown paragravelly clay

Bedrock:

14 to 37 inches—hard, fractured, moderately weathered serpentinite bedrock

37 inches—hard, fractured, consolidated serpentinite bedrock

Minor Components

Dissimilar:

- Small areas of serpentinite rock outcrop

Similar:

- El Descanso soils that have a finer textured profile
- Hoconuco soils that have a coarser textured profile

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: El Descanso—15 to 19 inches; Hoconuco—11 to 25 inches

Parent material: Residuum that weathered from serpentinite bedrock

Surface runoff: Very high

Drainage class: Well drained

Permeability: Slow

Available water capacity: Low

Flooding: None

Hazard of water erosion: Slight or low

Rock fragments in the surface layer: El Descanso—0 to 15 percent, by volume, mostly pebbles and cobbles; Hoconuco—2 to 15 percent, by volume, mostly pebbles and cobbles

Extent of rock outcrop: Less than 10 percent

Shrink-swell potential: Low

Natural fertility: Moderate

Content of organic matter in the surface layer: High

Reaction: El Descanso—slightly acid to neutral throughout; Hoconuco—strongly acid to slightly acid in the surface horizon and slightly acid or neutral in the subsoil

Land Use

Dominant uses: Forestland

Other uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Depth to rock; slope

Pasture and hayland

Suitability: Unsited

Management concerns: Depth to rock; slope

Naturalized pastureland

Suitability: Unsited

Management concerns: Depth to rock; slope

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock; slope; slippage

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.
- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by slippage.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Depth to rock; slope; low strength; slope; slippage

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.
- Constructing diversions across the slope improves the stability of side slopes.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Cutting and filling, designing structures to conform to the contour of the natural slope, or using the less sloping areas helps to overcome the slope limitation.
- A properly designed, alternate onsite sewage system can help to overcome the restricted depth to rock.

Picnic areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Establishing a suitable bed of topsoil helps to overcome the restricted depth to rock.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Playgrounds

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Establishing a suitable bed of topsoil helps to overcome the restricted depth to rock.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Paths and trails

Suitability: Suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: IVs

EdF—El Descanso-Hoconuco complex, 20 to 60 percent slopes

Setting

Landscape: Serpentinite mountains

Landform: Mountain slopes

Major uses: Forestland and wildlife habitat

Elevation: 2,460 to 3,280 feet

Composition

El Descanso and similar soils: 50 percent

Hoconuco and similar soils: 45 percent

Dissimilar soils: 5 percent

Typical Profiles

El Descanso

Surface layer:

0 to 3 inches—black mucky peat

3 to 8 inches—dark brown very gravelly clay loam

Subsoil:

8 to 15 inches—dark brown extremely paragravelly clay

Bedrock:

15 inches—hard, fractured, consolidated serpentinite bedrock

Hoconuco

Surface layer:

0 to 3 inches—very dark brown mucky peat

3 to 7 inches—dark brown gravelly clay loam

Subsoil:

7 to 14 inches—dark reddish brown paragravelly clay

Bedrock:

14 to 37 inches—hard, fractured, moderately weathered serpentinite bedrock

37 inches—hard, fractured, consolidated serpentinite bedrock

Minor Components

Dissimilar:

- Small areas of serpentinite rock outcrop

Similar:

- El Descanso soils that have a finer textured profile
- Hoconuco soils that have a coarser textured profile

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: El Descanso—15 to 19 inches; Hoconuco—11 to 25 inches

Parent material: Residuum that weathered from serpentinite bedrock

Surface runoff: Very high

Drainage class: Well drained

Permeability: Slow

Available water capacity: Low

Flooding: None

Hazard of water erosion: Low or moderate

Rock fragments in the surface layer: El Descanso—0 to 15 percent, by volume, mostly pebbles and cobbles; Hoconuco—2 to 15 percent, by volume, mostly pebbles and cobbles

Extent of rock outcrop: Less than 10 percent

Shrink-swell potential: Low

Natural fertility: Moderate

Content of organic matter in the surface layer: High

Reaction: El Descanso—slightly acid to neutral throughout; Hoconuco—strongly acid to slightly acid in the surface horizon and slightly acid or neutral in the subsoil

Land Use

Dominant uses: Forestland

Other uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Depth to rock; slope

Pasture and hayland

Suitability: Unsited

Management concerns: Depth to rock; slope

Naturalized pastureland

Suitability: Unsited

Management concerns: Depth to rock; slope

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock; slope; slippage

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.
- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by slippage.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Depth to rock; slope; low strength; slope; slippage

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.
- Constructing diversions across the slope improves the stability of side slopes.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Cutting and filling, designing structures to conform to the contour of the natural slope, or using the less sloping areas helps to overcome the slope limitation.
- A properly designed, alternate onsite sewage system can help to overcome the restricted depth to rock.

Picnic areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Establishing a suitable bed of topsoil helps to overcome the restricted depth to rock.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Playgrounds

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Establishing a suitable bed of topsoil helps to overcome the restricted depth to rock.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: VIs

EdG—El Descanso-Hoconuco complex, 60 to 90 percent slopes

Setting

Landscape: Serpentinite mountains

Landform: Mountain slopes

Major uses: Forestland and wildlife habitat

Elevation: 2,460 to 3,280 feet

Composition

El Descanso and similar soils: 50 percent

Hoconuco and similar soils: 45 percent

Dissimilar soils: 5 percent

Typical Profiles

El Descanso

Surface layer:

0 to 3 inches—black mucky peat

3 to 8 inches—dark brown very gravelly clay loam

Subsoil:

8 to 15 inches—dark brown extremely paragravelly clay

Bedrock:

15 inches—hard, fractured, consolidated serpentinite bedrock

Hoconuco

Surface layer:

0 to 3 inches—very dark brown mucky peat

3 to 7 inches—dark brown gravelly clay loam

Subsoil:

7 to 14 inches—dark reddish brown paragravelly clay

Bedrock:

14 to 37 inches—hard, fractured, moderately weathered serpentinite bedrock

37 inches—hard, fractured, consolidated serpentinite bedrock

Minor Components

Dissimilar:

- Small areas of serpentinite rock outcrop

Similar:

- El Descanso soils that have a finer textured profile
- Hoconuco soils that have a coarser textured profile

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: El Descanso—15 to 19 inches; Hoconuco—11 to 25 inches

Parent material: Residuum that weathered from serpentinite bedrock

Surface runoff: Very high

Drainage class: Well drained

Permeability: Slow

Available water capacity: Low

Flooding: None

Hazard of water erosion: Moderate

Rock fragments in the surface layer: El Descanso—0 to 15 percent, by volume, mostly pebbles and cobbles; Hoconuco—2 to 15 percent, by volume, mostly pebbles and cobbles

Extent of rock outcrop: Less than 10 percent

Shrink-swell potential: Low

Natural fertility: Moderate

Content of organic matter in the surface layer: High

Reaction: El Descanso—slightly acid to neutral throughout; Hoconuco—strongly acid to slightly acid in the surface horizon and slightly acid or neutral in the subsoil

Land Use

Dominant uses: Forestland

Other uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Depth to rock; slope

Pasture and hayland

Suitability: Unsited

Management concerns: Depth to rock; slope

Naturalized pastureland

Suitability: Unsited

Management concerns: Depth to rock; slope

Urban Development

Dwellings

Suitability: Unsited

Management concerns: Depth to rock; slope; slippage

Septic tank absorption fields

Suitability: Unsited

Management concerns: Depth to rock; slope

Local roads and streets

Suitability: Poorly suited

Management concerns: Depth to rock; slope; low strength; slope; slippage

Management measures and considerations:

- A properly designed road drainage system that includes carefully located culverts and gutters helps to control erosion.
- Road cuts can expose a large amount of fractured bedrock, which is subject to slumping.
- Cut slopes are subject to slumping where rock layers are parallel to the slope.

Recreational Development

Camp areas

Suitability: Unsited

Management concerns: Depth to rock; slope

Picnic areas

Suitability: Unsited

Management concerns: Depth to rock; slope

Playgrounds

Suitability: Unsited

Management concerns: Depth to rock; slope

Paths and trails

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: Vlle

EpC—El Papayo gravelly clay loam, 2 to 12 percent slopes

Setting

Landscape: Hills

Landform: Volcanic hillslopes

Major uses: Naturalized pastureland

Elevation: 15 to 1,000 feet

Composition

El Papayo and similar soils: 95 percent

Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 2 inches—dark brown gravelly clay loam

Subsoil:

2 to 14 inches—dark brown clay

Bedrock:

14 to 16 inches—highly fractured, unconsolidated andesite rock

16 inches—hard, consolidated andesite rock

Minor Components

Dissimilar:

- Montalva soils, which have fractured, semiconsolidated volcanic rock below a depth of 20 inches and are in the lower positions

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: 7 to 17 inches

Parent material: Residuum and colluvium that weathered from basic volcanic rock

Surface runoff: Medium

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Low

Rock fragments in the surface layer: 10 to 40 percent, by volume, pebbles

Shrink-swell potential: High

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Slightly acid or neutral throughout

Land Use

Dominant uses: Naturalized pastureland

Other uses: Pasture

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Pigeonpeas

Management concerns: Depth to rock; slope; very low available water capacity

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, contour stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.

Pasture and hayland

Suitability: Moderately suited

Commonly grown crops: Hurricanegrass; Kleberg's bluestem

Management concerns: Erosion; weed control

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Mechanical and chemical means can be used to help control competition from weeds.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Erosion; weed control

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock; shrink-swell potential

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Depth to rock; low strength; shrink-swell potential

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.

Recreational Development

Camp areas

Suitability: Suited

Management concerns: None

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Suited

Management concerns: None

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Suited

Management concerns: None

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Well suited

Interpretive Group

Land capability classification: IVs

EpD—El Papayo gravelly clay loam, 12 to 20 percent slopes

Setting

Landscape: Hills

Landform: Volcanic hillslopes

Major uses: Naturalized pastureland

Elevation: 25 to 1,000 feet

Composition

El Papayo and similar soils: 95 percent

Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 2 inches—dark brown gravelly clay loam

Subsoil:

2 to 14 inches—dark brown clay

Bedrock:

14 to 16 inches—highly fractured, unconsolidated andesite rock

16 inches—hard, consolidated andesite rock

Minor Components

Dissimilar:

- Montalva soils, which have fractured, semiconsolidated volcanic rock below a depth of 20 inches deep and are in the lower, less sloping areas

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: 7 to 17 inches

Parent material: Residuum and colluvium that weathered from basic volcanic rock

Surface runoff: Medium

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Moderate to severe

Rock fragments in the surface layer: 10 to 40 percent, by volume, pebbles

Shrink-swell potential: High

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Slightly acid or neutral

Land Use

Dominant uses: Naturalized pastureland

Other uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Poorly suited or unsuited

Commonly grown crops: Pigeonpeas

Management concerns: Depth to rock; slope

Pasture and hayland

Suitability: Moderately suited to pasture; unsuited to hayland

Commonly grown crops: Hurricanegrass; Kleberg's bluestem

Management concerns: Depth to rock; slope

Management measures and considerations:

- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock; shrink-swell potential; slope

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Depth to rock; low strength; shrink-swell potential; slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: IVe

EpF—El Papayo gravelly clay loam, 20 to 60 percent slopes

Setting

Landscape: Hills

Landform: Volcanic hillslopes

Major uses: Wildlife habitat

Elevation: 50 to 1,312 feet

Composition

El Papayo and similar soils: 95 percent

Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 2 inches—dark brown gravelly clay loam

Subsoil:

2 to 14 inches—dark brown clay

Bedrock:

14 to 16 inches—highly fractured, unconsolidated andesite rock

16 inches—hard, consolidated andesite rock

Minor Components

Dissimilar:

- Pitahaya soils, which are shallow to fractured limestone bedrock
- Scattered areas of volcanic rock outcrop

Similar:

- Scattered areas of less sloping El Papayo soils

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: 7 to 17 inches

Parent material: Residuum and colluvium that weathered from basic volcanic rock

Surface runoff: High

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Severe or very severe

Rock fragments in the surface layer: 10 to 40 percent, by volume, pebbles

Extent of rock outcrop: Less than 10 percent

Shrink-swell potential: High

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Slightly acid or neutral throughout

Land Use

Dominant uses: Wildlife habitat

Other uses: Forestland

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Depth to rock; slope

Pasture and hayland

Suitability: Poorly suited to pasture; unsited to hayland

Management concerns: Depth to rock; slope

- Erosion is a concern in unprotected areas.
- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock; shrink-swell potential; slope

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Depth to rock; low strength; shrink-swell potential; slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: VIs

FeA—Fé clay, 0 to 2 percent slopes

Setting

Landscape: Basins

Landform: Fan skirts

Major uses: Hayland and pasture

Elevation: Sea level to 165 feet

Composition

Fé and similar soils: 95 percent

Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 17 inches—dark reddish brown clay

Subsoil:

17 to 28 inches—dark reddish brown clay that has fine salt crystals

28 to 56 inches—dark reddish gray clay that has fine salt crystals

Minor Components

Dissimilar:

- Cartagena and Fraternidad soils, which are moderately well drained and are in the higher positions

Similar:

- Aguirre and Guánica soils, which have a higher clay content in the subsoil than the Fé soil. Also, the Aguirre soils have a subsoil that dominantly has hue of 10YR or darker.

Soil Properties and Qualities

Depth class: Very deep

Parent material: Clayey alluvial sediments that weathered from igneous, metamorphic, and sedimentary rocks

Surface runoff: Medium

Drainage class: Somewhat poorly drained

Permeability: Very slow

Available water capacity: Moderate

Seasonal high water table: Apparent, at a depth of 4 to 6 feet from September through November

Flooding: None

Hazard of water erosion: Slight

Shrink-swell potential: High or very high

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Moderately alkaline to very strongly alkaline throughout

Salinity: Moderately saline

Sodicity: Moderate or strong

Land Use

Dominant uses: Hayland

Other uses: Pasture

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Salinity; sodicity; tilth

Pasture and hayland

Suitability: Moderately suited

Commonly grown crops: Guineagrass; hurricanegrass; Kleberg's bluestem; para grass

Management concerns: Salinity; sodicity

Management measures and considerations:

- Salinity and sodicity limit the use of this soil.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Salinity; sodicity

Management measures and considerations:

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Unsited

Management concerns: Shrink-swell potential

Septic tank absorption fields

Suitability: Unsited

Management concerns: Very slow permeability

Local roads and streets

Suitability: Poorly suited

Management concerns: Shrink-swell potential; low strength

Management measures and considerations:

- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Unsited

Management concerns: Very slow permeability; too clayey

Picnic areas

Suitability: Unsited

Management concerns: Very slow permeability; too clayey

Playgrounds

Suitability: Unsited

Management concerns: Very slow permeability; too clayey

Paths and trails

Suitability: Moderately suited

Management concerns: Too clayey

Interpretive Group

Land capability classification: IVs

FrA—Fraternidad clay, 0 to 2 percent slopes

Setting

Landscape: Basins

Landform: Fan skirts

Major uses: Hayland, pasture, and cropland

Elevation: Sea level to 165 feet

Composition

Fraternidad and similar soils: 95 percent

Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 13 inches—very dark gray clay

Subsurface layer:

13 to 17 inches—very dark grayish brown and brown clay

Subsoil:

17 to 42 inches—dark yellowish brown clay that has iron-manganese concretions and filaments of calcium carbonate

42 to 65 inches—dark yellowish brown and brown clay that has iron-manganese concretions and filaments of calcium carbonate

Minor Components

Dissimilar:

- Cartagena soils, which are moderately well drained and are in the lower positions

Similar:

- Santa Isabel soils, which do not have accumulations of calcium carbonate in the upper part of the subsoil

Soil Properties and Qualities

Depth class: Very deep

Parent material: Clayey alluvial sediments that weathered from igneous, metamorphic, and sedimentary rocks

Surface runoff: Medium

Drainage class: Moderately well drained

Permeability: Very slow

Available water capacity: High

Seasonal high water table: None within a depth of 6 feet

Flooding: None

Hazard of water erosion: Slight

Shrink-swell potential: Very high

Natural fertility: High

Content of organic matter in the surface layer: Moderate

Reaction: Slightly alkaline or moderately alkaline throughout

Land Use

Dominant uses: Hayland

Other uses: Pasture; cropland

Agricultural Development

Cropland

Suitability: Well suited

Commonly grown crops: Rice; sugar cane; cash crops

Management concerns: Tilt

Management measures and considerations:

- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.

Pasture and hayland

Suitability: Well suited

Commonly grown crops: African star grass; buffelgrass; hurricanegrass; Kleberg's bluestem

Management concerns: Tilt

Management measures and considerations:

- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilt.

Naturalized pastureland

Suitability: Well suited

Management concerns: Tilt

Management measures and considerations:

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilt.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Shrink-swell potential

Management measures and considerations:

- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Very slow permeability

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Shrink-swell potential; low strength

Management measures and considerations:

- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Moderately suited

Management concerns: Too clayey; very slow permeability

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Picnic areas

Suitability: Moderately suited

Management concerns: Too clayey; very slow permeability

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Playgrounds

Suitability: Moderately suited

Management concerns: Too clayey; very slow permeability

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Paths and trails

Suitability: Moderately suited

Management concerns: Too clayey; very slow permeability

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Interpretive Group

Land capability classification: IIIc

FrB—Fraternidad clay, 2 to 5 percent slopes***Setting***

Landscape: Basins

Landform: Fan skirts

Major uses: Hayland, pasture, and cropland

Elevation: Sea level to 165 feet

Composition

Fraternidad and similar soils: 95 percent

Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 13 inches—very dark gray clay

Subsurface layer:

13 to 17 inches—very dark grayish brown and brown clay

Subsoil:

17 to 42 inches—dark yellowish brown clay that has iron-manganese concretions and filaments of calcium carbonate

42 to 65 inches—dark yellowish brown and brown clay that has iron-manganese concretions and filaments of calcium carbonate

Minor Components

Dissimilar:

- Cartagena soils, which are moderately well drained and are in the lower positions

Similar:

- Santa Isabel soils, which do not have accumulations of calcium carbonate in the upper part of the subsoil

Soil Properties and Qualities

Depth class: Very deep

Parent material: Clayey alluvial sediments that weathered from igneous, metamorphic, and sedimentary rocks

Surface runoff: Medium

Drainage class: Moderately well drained

Permeability: Very slow

Available water capacity: High

Seasonal high water table: None within a depth of 6 feet

Flooding: None

Hazard of water erosion: Moderate or high

Shrink-swell potential: Very high

Natural fertility: High

Content of organic matter in the surface layer: Moderate

Reaction: Slightly alkaline or moderately alkaline

Land Use

Dominant uses: Hayland

Other uses: Pasture; cropland

Agricultural Development

Cropland

Suitability: Well suited

Commonly grown crops: Rice; sugar cane; cash crops

Management concerns: Tilt; slope

Management measures and considerations:

- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.
- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.

Pasture and hayland

Suitability: Well suited

Commonly grown crops: African star grass; buffelgrass; hurricanegrass; Kleberg's bluestem

Management concerns: Tilt

Management measures and considerations:

- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilt.

Naturalized pastureland

Suitability: Well suited

Management concerns: Tilt

Management measures and considerations:

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilt.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Shrink-swell potential

Management measures and considerations:

- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Very slow permeability

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Shrink-swell potential; low strength

Management measures and considerations:

- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Moderately suited

Management concerns: Too clayey

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Picnic areas

Suitability: Moderately suited

Management concerns: Too clayey

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Playgrounds

Suitability: Moderately suited

Management concerns: Too clayey

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Paths and trails

Suitability: Moderately suited

Management concerns: Too clayey

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Interpretive Group

Land capability classification: IIIc

GbF—Guanábano clay, 20 to 60 percent slopes

Setting

Landscape: Low hills

Landform: Ridges and hillslopes

Major uses: Urban development

Elevation: 260 to 660 feet

Composition

Guanábano and similar soils: 95 percent

Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 6 inches—very dark brown clay

Subsoil:

6 to 13 inches—dark reddish brown clay

13 to 21 inches—dark yellowish brown gravelly clay

Substratum:

21 to 80 inches—mottled brown, dark yellowish brown, and dark grayish brown cobbly clay loam

Minor Components

Dissimilar:

- Jácana and Descalabrado soils, which are moderately deep and shallow to fractured volcanic bedrock
- Malaya soils, which are shallow to calcareous tuffaceous bedrock

Similar:

- Scattered areas of less sloping Guanábano soils

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Colluvial deposits of sand, gravel, mudstone, and sandstone or deposits of shale, sandy limestone, and sandy conglomerate

Surface runoff: High

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Low

Flooding: None

Hazard of water erosion: Severe or very severe

Rock fragments in the surface layer: 5 to 25 percent, by volume, pebbles; and less than 2 percent, by volume, cobbles

Shrink-swell potential: High

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Strongly acid to neutral in the surface layer and slightly acid or neutral in the subsoil

Land Use

Dominant uses: Urban development

Other uses: Naturalized pastureland; cropland

Agricultural Development

Cropland

Suitability: Poorly suited or unsuited

Commonly grown crops: Pigeonpeas

Management concerns: Slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, contour stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland

Management concerns: Slope; erosion

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Shrink-swell potential; slope

Management measures and considerations:

- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; shrink-swell potential; slope

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope; small stones

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: VIe

GhC—Guanajibo gravelly sandy clay loam, 2 to 12 percent slopes

Setting

Landscape: Coastal plains

Landform: Coastal terraces and alluvial fans

Major uses: Naturalized pastureland

Elevation: 15 to 165 feet

Composition

Guanajibo and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 10 inches—very dark reddish brown gravelly sandy clay loam

Subsoil:

10 to 21 inches—strong brown clay that has red mottles

21 to 37 inches—strong brown clay that has plinthite and red mottles

37 to 63 inches—mottled light olive brown, pale yellow, dark red, strong brown, and brown clay that has plinthite

Minor Components

Dissimilar:

- Delicias soils, which do not have plinthite in the subsoil and are in the higher positions

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Fine-textured sediments of mixed origin

Surface runoff: Low or medium

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Very high

Seasonal high water table: None within a depth of 80 inches

Flooding: None

Hazard of water erosion: Low or moderate

Rock fragments in the surface layer: 0 to 30 percent, by volume, pebbles

Shrink-swell potential: Low

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate to high

Reaction: Very strongly acid or strongly acid throughout

Land Use

Dominant uses: Naturalized pastureland (fig. 11)

Other uses: Pasture; urban development



Figure 11.—Naturalized pastureland in an area of Guanajibo gravelly sandy clay loam, 2 to 12 percent slopes.

Agricultural Development

Cropland

Suitability: Well suited

Commonly grown crops: Sugar cane

Management concerns: Slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Well suited

Commonly grown crops: African star grass; guineagrass; pangola grass

Management concerns: Slope

Management measures and considerations:

- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity during the establishment, maintenance, or renovation of hayland and pasture.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Well suited

Commonly grown crops: Guineagrass

Management concerns: Slope

Management measures and considerations:

- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity during the establishment, maintenance, or renovation of pasture.
- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Suited

Management concerns: Slope

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Moderately suited

Management concerns: Slow permeability; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Suited

Management concerns: Slope

Management measures and considerations:

- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Moderately suited or poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Paths and trails

Suitability: Well suited

Interpretive Group

Land capability classification: IVe

GnA—Guánica clay, 0 to 1 percent slopes

Setting

Landscape: Basins

Landform: Basin floors

Major uses: Hayland and pasture

Elevation: Sea level to 165 feet

Composition

Guánica and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 4 inches—black clay

Subsurface layer:

4 to 12 inches—black clay that has calcium carbonate concretions

Subsoil:

12 to 25 inches—black clay that has calcium carbonate concretions

25 to 33 inches—black and dark reddish brown clay that has calcium carbonate concretions

33 to 52 inches—dark reddish brown clay that has calcium carbonate concretions

52 to 68 inches—reddish brown clay that has salt crystals, soft masses of calcium carbonate, and iron-manganese concretions

68 to 79 inches—reddish brown clay that has salt crystals, soft masses of calcium carbonate, and iron-manganese concretions

Minor Components

Dissimilar:

- Cartagena and Fraternidad soils, which are moderately well drained and are in the higher positions

Similar:

- Aguirre soils, which have a subsoil that dominantly has hue of 10YR or darker
- Fé soils, which have a coarser textured profile than the Guánica soil

Soil Properties and Qualities

Depth class: Very deep

Parent material: Clayey alluvial sediments

Surface runoff: Negligible

Drainage class: Somewhat poorly drained

Permeability: Very slow

Available water capacity: Low or moderate

Seasonal high water table: Perched, at the surface to 1½ feet above the surface from July through September

Flooding: None

Hazard of water erosion: Slight

Shrink-swell potential: Very high

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Slightly alkaline or moderately alkaline throughout

Carbonates: Common to many throughout the profile

Salinity: Slightly saline or moderately saline

Sodicity: Moderate

Land Use

Dominant uses: Hayland

Other uses: Pasture; cropland

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Rice; sugar cane

Management concerns: Seasonal wetness; salinity; sodicity; tilth

Management measures and considerations:

- Salinity, sodicity, and seasonal wetness limit the use of this soil.
- Restricting tillage to periods when the soil is not wet helps to prevent clodding and crusting.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.

Pasture and hayland

Suitability: Moderately suited

Commonly grown crops: Buffelgrass; guineagrass; para grass; Kleberg's bluestem; hurricanegrass

Management concerns: Seasonal wetness; salinity; sodicity

Management measures and considerations:

- Salinity, sodicity, and seasonal wetness limit the use of this soil.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Seasonal wetness

Management measures and considerations:

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Unsited

Management concerns: Ponding; shrink-swell potential

Septic tank absorption fields

Suitability: Unsited

Management concerns: Ponding; restricted permeability

Local roads and streets

Suitability: Poorly suited

Management concerns: Shrink-swell potential; low strength; ponding

Management measures and considerations:

- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Unsited

Management concerns: Ponding; restricted permeability; too clayey

Picnic areas

Suitability: Unsited

Management concerns: Ponding; restricted permeability; too clayey

Playgrounds

Suitability: Unsited

Management concerns: Ponding; restricted permeability; too clayey

Paths and trails

Suitability: Unsited

Management concerns: Ponding; too clayey

Interpretive Group

Land capability classification: IIIs

GuB—Guayabo fine sand, 0 to 5 percent slopes

Setting

Landscape: Coastal plains

Landform: Coastal plains

Major uses: Wildlife habitat and urban development

Elevation: 15 to 80 feet

Composition

Guayabo and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 7 inches—brown fine sand

Subsurface layer:

7 to 13 inches—pale brown sand

13 to 18 inches—pale brown fine sand that has strong brown stains

18 to 35 inches—very pale brown sand that has strong brown stains

35 to 55 inches—very pale brown sand

Subsoil:

55 to 65 inches—very pale brown fine sand that has yellowish red mottles

65 to 75 inches—mottled red, strong brown, and pale brown loamy sand

Minor Components

Dissimilar:

- Sosa soils, which have a finer textured profile than the Guayabo soil and are in the higher positions

Similar:

- Bahía soils that are in positions similar to those of the Guayabo soil but have kaolinitic mineralogy

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Sandy marine deposits

Surface runoff: Negligible

Drainage class: Excessively drained

Permeability: Rapid

Available water capacity: Very low

Seasonal high water table: None within a depth of 80 inches

Flooding: None

Hazard of water erosion: Low

Rock fragments in the surface layer: Less than 2 percent, by volume, pebbles

Rock fragments in the subsoil: 0 to less than 15 percent, by volume, pebbles

Shrink-swell potential: Low

Natural fertility: Low

Content of organic matter in the surface layer: Low

Reaction: Slightly acid to moderately alkaline throughout

Land Use

Dominant uses: Wildlife habitat; urban development

Other uses: Cropland

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Watermelons; root crops; vegetables

Management concerns: Very low available water capacity

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Moderately suited

Commonly grown crops: Buffelgrass; guineagrass; hurricanegrass; Kleberg's bluestem

Management concerns: Very low available water capacity

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Moderately suited

Commonly grown crops: Buffelgrass; guineagrass; hurricanegrass; Kleberg's bluestem

Management concerns: Very low available water capacity

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Instability of cutbanks

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Poor filtering capacity

Management measures and considerations:

- If the density of the housing is moderate to high, a community sewage system is needed to prevent contamination by seepage.
- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Suited

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Too sandy

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Picnic areas

Suitability: Poorly suited

Management concerns: Too sandy

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Playgrounds

Suitability: Poorly suited

Management concerns: Too sandy

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Paths and trails

Suitability: Poorly suited

Management concerns: Too sandy

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Interpretive Group

Land capability classification: IIIs

GyB—Guayacán clay, 0 to 5 percent slopes

Setting

Landscape: Uplands

Landform: Alluvial fans

Major uses: Pasture

Elevation: 15 to 50 feet

Composition

Guayacán and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 8 inches—dark brown clay

Subsoil:

8 to 12 inches—very dark grayish brown clay loam

12 to 25 inches—dark yellowish brown clay that has common filaments of calcium carbonate

25 to 45 inches—yellowish brown gravelly loam that has soft masses of calcium carbonate

Substratum:

45 to 59 inches—brown loam that has soft masses of calcium carbonate

59 to 76 inches—very dark grayish brown very gravelly silt loam that has soft masses of calcium carbonate

76 to 90 inches—very dark grayish brown gravelly clay loam that has soft masses of calcium carbonate

Minor Components

Dissimilar:

- Altamira soils, which are deep to soft limestone bedrock and have a coarser subsoil than the Guayacán soil

Similar:

- Steeper Guayacán soils

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Material that weathered from limestone

Surface runoff: Medium

Drainage class: Well drained

Permeability: Moderately slow

Available water capacity: Very low

Seasonal high water table: None within a depth of 80 inches

Flooding: None

Hazard of water erosion: Slight

Rock fragments in the surface layer: Less than 10 percent, by volume, pebbles

Shrink-swell potential: Low

Natural fertility: High

Content of organic matter in the surface layer: Moderate to high

Reaction: Slightly alkaline or moderately alkaline in the surface layer and moderately alkaline in the subsoil and substratum

Effervescence: Slightly effervescent or strongly effervescent

Land Use

Dominant uses: Pasture

Other uses: Hayland

Agricultural Development

Cropland

Suitability: Moderately suited

Commonly grown crops: Cash crops

Management concerns: Very low available water capacity

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.

Pasture and hayland

Suitability: Well suited

Commonly grown crops: Hurricanegrass; Kleberg's bluestem

Management concerns: Weed competition

Management measures and considerations:

- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.
- Using perennial grasses and legumes in rotation helps to penetrate and breakup the clayey root zone.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Well suited

Commonly grown crops: Hurricanegrass; Kleberg's bluestem

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Moderately suited

Management concerns: Slow permeability

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Moderately suited

Management concerns: Low strength

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Well suited

Picnic areas

Suitability: Well suited

Playgrounds

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Paths and trails

Suitability: Well suited

Interpretive Group

Land capability classification: IIc

GyC—Guayacán clay, 5 to 12 percent slopes

Setting

Landscape: Uplands

Landform: Low hills and alluvial fans

Major uses: Pasture

Elevation: 50 to 165 feet

Composition

Guayacán and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 8 inches—dark brown clay

Subsoil:

8 to 12 inches—very dark grayish brown clay loam

12 to 25 inches—dark yellowish brown clay that has common filaments of calcium carbonate

25 to 45 inches—yellowish brown gravelly loam that has soft masses of calcium carbonate

Substratum:

45 to 59 inches—brown loam that has soft masses of calcium carbonate

59 to 76 inches—very dark grayish brown very gravelly silt loam that has soft masses of calcium carbonate

76 to 90 inches—very dark grayish brown gravelly clay loam that has soft masses of calcium carbonate

Minor Components

Dissimilar:

- Altamira soils, which are deep to soft limestone bedrock and have a coarser subsoil than the Guayacán soil

Similar:

- Steeper Guayacán soils

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Material that weathered from limestone

Surface runoff: High

Drainage class: Well drained

Permeability: Moderately slow

Available water capacity: Very low

Seasonal high water table: None within a depth of 80 inches

Flooding: None

Hazard of water erosion: Moderate

Rock fragments in the surface layer: Less than 10 percent, by volume, pebbles

Shrink-swell potential: Low

Natural fertility: High

Content of organic matter in the surface layer: Moderate to high

Reaction: Slightly alkaline or moderately alkaline in the surface layer and moderately alkaline in the subsoil and substratum

Effervescence: Slightly effervescent or strongly effervescent

Land Use

Dominant uses: Pasture

Other uses: Hayland

Agricultural Development

Cropland

Suitability: Moderately suited

Commonly grown crops: Cash crops

Management concerns: Very low available water capacity; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.

Pasture and hayland

Suitability: Well suited to pasture; moderately suited to hayland

Commonly grown crops: Hurricanegrass; Kleberg's bluestem

Management concerns: Weed competition; slope

Management measures and considerations:

- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.
- Using perennial grasses and legumes in rotation helps to penetrate and breakup the clayey root zone.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Well suited

Commonly grown crops: Hurricanegrass; Kleberg's bluestem

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Moderately suited

Management concerns: Slow permeability; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Moderately suited

Management concerns: Low strength; slope

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Well suited

Interpretive Group

Land capability classification: IIIc

GyD—Guayacán clay, 12 to 20 percent slopes

Setting

Landscape: Uplands

Landform: Low hills

Major uses: Pasture
Elevation: 50 to 165 feet

Composition

Guayacán and similar soils: 90 percent
Dissimilar soils: 10 percent

Typical Profile

Surface layer:
0 to 8 inches—dark brown clay

Subsoil:
8 to 12 inches—very dark grayish brown clay loam
12 to 25 inches—dark yellowish brown clay that has filaments of calcium carbonate
25 to 45 inches—yellowish brown gravelly loam that has soft masses of calcium carbonate

Substratum:
45 to 59 inches—brown loam that has soft masses of calcium carbonate
59 to 76 inches—very dark grayish brown very gravelly silt loam that has soft masses of calcium carbonate
76 to 90 inches—very dark grayish brown gravelly clay loam that has soft masses of calcium carbonate

Minor Components

Dissimilar:

- Altamira soils, which are deep to soft limestone bedrock and have a coarser subsoil than the Guayacán soil
- Costa and Pitahaya soils, which are shallow to limestone bedrock

Similar:

- Steeper Guayacán soils

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: More than 80 inches
Parent material: Material that weathered from limestone
Surface runoff: High
Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: Very low
Seasonal high water table: None within a depth of 80 inches
Flooding: None
Hazard of water erosion: Severe
Rock fragments in the surface layer: Less than 10 percent, by volume, pebbles
Shrink-swell potential: Low
Natural fertility: High
Content of organic matter in the surface layer: Moderate to high
Reaction: Slightly alkaline or moderately alkaline in the surface layer and moderately alkaline in the subsoil and substratum
Effervescence: Slightly effervescent or strongly effervescent

Land Use

Dominant uses: Pasture
Other uses: Naturalized pastureland

Agricultural Development

Cropland

Suitability: Poorly suited

Management concerns: Very low available water capacity; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.

Pasture and hayland

Suitability: Moderately suited to pasture; poorly suited to hayland

Commonly grown crops: Guineagrass

Management concerns: Weed competition; slope

Management measures and considerations:

- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.
- Using perennial grasses and legumes in rotation helps to penetrate and breakup the clayey root zone.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Moderately suited

Commonly grown crops: Guineagrass

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Slow permeability; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: IIIe

HmD—Humatas clay, 12 to 20 percent slopes

Setting

Landscape: Hills and mountains

Landform: Ridges, hillslopes, and mountain slopes

Major uses: Cropland

Elevation: 85 to 1,970 feet

Composition

Humatas and similar soils: 80 percent

Dissimilar soils: 20 percent

Typical Profile

Surface layer:

0 to 5 inches—red clay

Subsoil:

5 to 32 inches—red clay

32 to 44 inches—red clay that has saprolite-like material

Underlying material:

44 to 60 inches—mottled dark red, red, strong brown, and reddish yellow saprolite that has a texture of silty clay loam

Minor Components

Dissimilar:

- Múcara soils, which do not have an argillic horizon, have a coarser textured profile than the Humatas soil, and are moderately deep to volcanic rock

Similar:

- Consumo soils, which have a thinner subsoil than the Humatas soil
- Less sloping Humatas soils

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Clayey and loamy residuum that weathered from igneous bedrock

Surface runoff: High

Drainage class: Well drained

Permeability: Moderately slow

Available water capacity: High

Flooding: None

Hazard of water erosion: Moderate

Rock fragments in the surface layer: Less than 10 percent, by volume, pebbles

Shrink-swell potential: Moderate in the surface layer; high in the subsoil

Natural fertility: Low

Content of organic matter in the surface layer: Moderately low to high

Reaction: Strongly acid or very strongly acid throughout

Land Use

Dominant uses: Cropland

Other uses: Forestland

Agricultural Development

Cropland

Suitability: Moderately suited

Commonly grown crops: Bananas; coffee; oranges; plantains; yams; taniens

Management concerns: Erosion; soil fertility; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.

Pasture and hayland

Suitability: Moderately suited to pasture; unsuited to hayland

Commonly grown crops: Pangola grass

Management concerns: Erosion; slope; weed control

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The moderately steep slopes increase the difficulty of management.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Biodegradable or synthetic ground covers should be used to protect eroded areas.
- Preparing seedbeds on the contour or across the slope helps to control erosion and increases the rate of germination.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The moderately steep slopes increase the difficulty of management.
- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Slope; slippage; shrink-swell potential

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.
- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Slippage; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; slope; slippage; shrink-swell potential

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.
- Constructing diversions across the slope improves the stability of side slopes.
- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: IIIe

HmE—Humatas clay, 20 to 40 percent slopes***Setting***

Landscape: Hills and mountains

Landform: Hillslopes and mountain slopes

Major uses: Cropland

Elevation: 85 to 2,100 feet

Composition

Humatas and similar soils: 80 percent

Dissimilar soils: 20 percent

Typical Profile

Surface layer:

0 to 5 inches—red clay

Subsoil:

5 to 32 inches—red clay

32 to 44 inches—red clay that has saprolite-like material

Underlying material:

44 to 60 inches—mottled dark red, red, strong brown, and reddish yellow saprolite that has a texture of silty clay loam

Minor Components

Dissimilar:

- Múcara soils, which do not have an argillic horizon, have a coarser textured profile than the Humatas soil, and are moderately deep to volcanic rock

Similar:

- Consumo soils, which have a thinner subsoil than the Humatas soil

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Clayey and loamy residuum that weathered from igneous bedrock

Surface runoff: Very high

Drainage class: Well drained

Permeability: Moderately slow

Available water capacity: High

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: Less than 10 percent, by volume, pebbles

Shrink-swell potential: Moderate in the surface layer; high in the subsoil

Natural fertility: Low

Content of organic matter in the surface layer: Moderately low to high

Reaction: Strongly acid or very strongly acid throughout

Land Use

Dominant uses: Cropland

Other uses: Forestland

Agricultural Development

Cropland

Suitability: Moderately suited

Commonly grown crops: Bananas; coffee; oranges; plantains; yams; taniens

Management concerns: Erosion; soil fertility; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.

Pasture and hayland

Suitability: Moderately suited to pasture; unsuited to hayland

Commonly grown crops: Pangola grass

Management concerns: Erosion; slope; weed competition

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The steep slopes increase the difficulty of management.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Biodegradable or synthetic ground covers should be used to protect eroded areas.
- Preparing seedbeds on the contour or across the slope helps to control erosion and increases the rate of germination.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The steep slopes increase the difficulty of management.
- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Slope; slippage; shrink-swell potential

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.
- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Slippage; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; slope; slippage; shrink-swell potential

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.
- Constructing diversions across the slope improves the stability of side slopes.
- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: IVe

HmF—Humatas clay, 40 to 60 percent slopes

Setting

Landscape: Hills and mountains

Landform: Hillslopes and mountain slopes

Major uses: Cropland

Elevation: 100 to 2,100 feet

Composition

Humatas and similar soils: 80 percent

Dissimilar soils: 20 percent

Typical Profile

Surface layer:

0 to 5 inches—red clay

Subsoil:

5 to 32 inches—red clay

32 to 44 inches—red clay that has saprolite-like material

Underlying material:

44 to 60 inches—mottled dark red, red, strong brown, and reddish yellow saprolite that has a texture of silty clay loam

Minor Components

Dissimilar:

- Múcara soils, which do not have an argillic horizon, have a coarser textured profile than the Humatas soil, and are moderately deep to volcanic rock

Similar:

- Consumo soils, which have a thinner subsoil than the Humatas soil

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Clayey and loamy residuum that weathered from igneous bedrock

Surface runoff: Very high

Drainage class: Well drained
Permeability: Moderately slow
Available water capacity: High
Flooding: None
Hazard of water erosion: Severe
Rock fragments in the surface layer: Less than 10 percent, by volume
Shrink-swell potential: Moderate in the surface layer; high in the subsoil
Natural fertility: Low
Content of organic matter in the surface layer: Moderately low to high
Reaction: Strongly acid or very strongly acid throughout

Land Use

Dominant uses: Cropland
Other uses: Forestland

Agricultural Development

Cropland

Suitability: Poorly suited
Commonly grown crops: Bananas; coffee; oranges; plantains
Management concerns: Erosion; soil fertility; slope
Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland
Commonly grown crops: Pangola grass
Management concerns: Erosion; weed control
Management measures and considerations:

- Erosion is a concern in unprotected areas.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Biodegradable or synthetic ground covers should be used to protect eroded areas.
- Preparing seedbeds on the contour or across the slope helps to control erosion and increases the rate of germination.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Poorly suited
Management concerns: Erosion
Management measures and considerations:

- Erosion is a concern in unprotected areas.
- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Slope; slippage; shrink-swell potential

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.
- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Slippage; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; slope; slippage; shrink-swell potential

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.
- Constructing diversions across the slope improves the stability of side slopes.
- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: VIe

JaB—Jácana clay, 0 to 5 percent slopes

Setting

Landscape: Uplands

Landform: Alluvial fans

Major uses: Hayland

Elevation: 164 to 1,312 feet

Composition

Jácana and similar soils: 80 percent

Dissimilar soils: 20 percent

Typical Profile

Surface layer:

0 to 20 inches—dark brown clay

Subsoil:

20 to 27 inches—dark brown clay

27 to 30 inches—dark yellowish brown clay

30 to 33 inches—dark yellowish brown clay loam

Bedrock:

33 inches—weathered, semiconsolidated, bedded volcanic rock

Minor Components

Dissimilar:

- Descalabrado soils, which are in the higher positions and have hard, consolidated volcanic rock at a depth of 10 to 20 inches
- Fraternidad soils, which do not have highly fractured, semiconsolidated volcanic rock in the upper 80 inches and are in the lower positions

Soil Properties and Qualities

Depth class: Moderately deep

Depth to bedrock: 24 to 39 inches

Parent material: Colluvium and residuum of mixed origin overlying basic volcanic bedrock

Surface runoff: Low

Drainage class: Well drained

Permeability: Moderately slow

Available water capacity: Low

Hazard of water erosion: Slight

Flooding: None

Rock fragments in the surface layer: Less than 15 percent, by volume, pebbles

Shrink-swell potential: High

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Slightly alkaline or moderately alkaline throughout

Land Use

Dominant uses: Hayland

Other uses: Cropland; naturalized pastureland

Agricultural Development

Cropland

Suitability: Moderately suited

Commonly grown crops: Cash crops; vegetables

Management concerns: Low available water capacity; tilth; slope

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.

Pasture and hayland

Suitability: Well suited

Commonly grown crops: Buffelgrass; guineagrass

Management concerns: Low available water capacity; weed competition

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Mechanical and chemical means can be used to help control competition from weeds.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.
- Using perennial grasses and legumes in rotation helps to penetrate and breakup the clayey root zone.

Naturalized pastureland

Suitability: Well suited

Management concerns: Low available water capacity

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Shrink-swell potential

Management measures and considerations:

- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slow permeability

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; shrink-swell potential

Management measures and considerations:

- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Moderately suited

Management concerns: Too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Moderately suited

Management concerns: Too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Moderately suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The use of suitable fill material from an offsite location should be considered.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Moderately suited

Management concerns: Low strength; shrink-swell potential; too clayey

Management measures and considerations:

- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Interpretive Group

Land capability classification: IIIc

JaC—Jácana clay, 5 to 12 percent slopes

Setting

Landscape: Uplands and foothills

Landform: Alluvial fans and hillslopes

Major uses: Pasture and hayland

Elevation: 164 to 1,312 feet

Composition

Jácana and similar soils: 80 percent

Dissimilar soils: 20 percent

Typical Profile

Surface layer:

0 to 20 inches—dark brown clay

Subsoil:

20 to 27 inches—dark brown clay

27 to 30 inches—dark yellowish brown clay

30 to 33 inches—dark yellowish brown clay loam

Bedrock:

33 inches—weathered, semiconsolidated, bedded volcanic rock

Minor Components

Dissimilar:

- Descalabrado soils that are in positions similar to those of the Jácana soil but have hard, consolidated volcanic rock at a depth of 10 to 20 inches

Similar:

- An eroded phase of Jácana soils that has a thinner surface layer

Soil Properties and Qualities

Depth class: Moderately deep

Depth to bedrock: 24 to 39 inches

Parent material: Colluvium and residuum of mixed origin overlying basic volcanic bedrock

Surface runoff: Medium

Drainage class: Well drained

Permeability: Moderately slow

Available water capacity: Low

Hazard of water erosion: Slight to moderate

Flooding: None

Rock fragments in the surface layer: Less than 15 percent, by volume

Shrink-swell potential: High

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Slightly alkaline or moderately alkaline throughout

Land Use

Dominant uses: Pasture

Other uses: Hayland; naturalized pastureland

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Avocados; pigeonpeas

Management concerns: Low available water capacity; tilth; slope

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.

- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.

Pasture and hayland

Suitability: Moderately suited

Commonly grown crops: Buffelgrass; guineagrass

Management concerns: Erodibility; slope; weed competition; low available water capacity

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Mechanical and chemical means can be used to help control competition from weeds.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.
- Using perennial grasses and legumes in rotation helps to penetrate and breakup the clayey root zone.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Erodibility; slope; weed competition; low available water capacity.

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Shrink-swell potential

Management measures and considerations:

- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slow permeability

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; shrink-swell potential

Management measures and considerations:

- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Moderately suited

Management concerns: Slope; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- The use of suitable fill material from an offsite location should be considered.

Picnic areas

Suitability: Moderately suited

Management concerns: Slope; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- The use of suitable fill material from an offsite location should be considered.

Playgrounds

Suitability: Poorly suited

Management concerns: Depth to rock; slope; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- The use of suitable fill material from an offsite location should be considered.

Paths and trails

Suitability: Moderately suited

Management concerns: Low strength; shrink-swell potential; too clayey

Management measures and considerations:

- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Interpretive Group

Land capability classification: IVc

JBA—Joyuda, Atolladero, and Bajura soils, very frequently flooded

Setting

Landscape: Coastal plains

Landform: Joyuda—along the coast on salt marshes; Atolladero—along the coast near salt marshes; Bajura—in depressions along the coast

Major uses: Wildlife habitat

Elevation: Sea level to 85 feet

Composition

Joyuda and similar soils: 50 percent

Atolladero and similar soils: 30 percent

Bajura and similar soils: 20 percent

Typical Profiles

Joyuda

Surface layer:

0 to 4 inches—black mucky peat

Subsurface layer:

4 to 80 inches—greenish black muck

Atolladero

Surface layer:

0 to 2 inches—black muck

Underlying material:

2 to 20 inches—dark greenish gray loamy sand

20 to 32 inches—dark greenish gray loamy sand that has dark yellowish brown mottles

32 to 60 inches—greenish black loamy sand

Bajura

Surface layer:

0 to 4 inches—very dark grayish brown clay

Subsoil:

4 to 16 inches—very dark grayish brown clay that has dark reddish brown and dark brown mottles

16 to 42 inches—very dark gray clay that has very dark gray and dark brown mottles

Underlying material:

42 to 47 inches—dark greenish gray clay that has yellowish red mottles

47 to 60 inches—mottled black, dark greenish gray, and yellowish red clay

60 to 80 inches—black clay that has dark red mottles

Minor Components

Dissimilar:

- Cataño soils, which are excessively drained

Soil Properties and Qualities

Depth class: Very deep

Parent material: Joyuda—decomposed organic material; Atolladero—regolith consisting of sand-size shell fragments, quartz grains, and subrounded volcanic fragments from recent beach deposits; Bajura—alluvium of mixed origin

Surface runoff: Negligible

Drainage class: Joyuda—very poorly drained; Atolladero—poorly drained; Bajura—poorly drained

Permeability: Joyuda—moderate; Atolladero—rapid; Bajura—slow

Available water capacity: Joyuda—very low; Atolladero—very low; Bajura—high

Seasonal high water table: Joyuda—either under water or flooded by high tides from July through October; Atolladero—apparent, at a depth of $\frac{1}{4}$ to $1\frac{1}{3}$ feet from July through October; Bajura—apparent, at a depth of $\frac{1}{2}$ to $2\frac{1}{2}$ feet from July through September

Flooding: Joyuda—frequent, long duration; Atolladero—frequent, brief duration; Bajura—frequent, brief duration

Hazard of water erosion: Slight

Shrink-swell potential: Joyuda—low; Atolladero—low; Bajura—very high

Natural fertility: Joyuda—high; Atolladero—low; Bajura—high

Content of organic matter in the surface layer: Joyuda—high; Atolladero—high; Bajura—moderate to high

Reaction: Joyuda—neutral to moderately alkaline; Atolladero—moderately alkaline;
Bajura—moderately acid to moderately alkaline

Land Use

Dominant uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Joyuda—flooding; Atolladero—flooding; Bajura—flooding, tilth

Pasture and hayland

Suitability: Joyuda—unsited to pasture and hayland; Atolladero—unsited to pasture and hayland; Bajura—poorly suited to pasture and unsited to hayland

Management concerns: Flooding

Naturalized pastureland

Suitability: Joyuda—unsited; Atolladero—unsited; Bajura—poorly suited

Management concerns: Flooding

Urban Development

Dwellings

Suitability: Unsited

Management concerns: Joyuda—subsidence, flooding; Atolladero—flooding; Bajura—flooding, shrink-swell potential

Septic tank absorption fields

Suitability: Unsited

Management concerns: Joyuda—subsidence, flooding; Atolladero—flooding; Bajura—slow permeability, flooding

Local roads and streets

Suitability: Unsited

Management concerns: Joyuda—subsidence, flooding; Atolladero—flooding; Bajura—shrink-swell potential, low strength, flooding

Management measures and considerations:

- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Joyuda—unsited

Management concerns: Joyuda—flooding, excess humus; Atolladero—too sandy, flooding; Bajura—too clayey, flooding

Picnic areas

Suitability: Unsited

Management concerns: Joyuda—flooding, excess humus; Atolladero—too sandy, flooding; Bajura—too clayey, flooding

Playgrounds

Suitability: Unsited

Management concerns: Joyuda—flooding, excess humus; Atolladero—too sandy, flooding; Bajura—too clayey, flooding

Paths and trails

Suitability: Unsited

Management concerns: Joyuda—flooding, excess humus; Atolladero—too sandy, flooding; Bajura—too clayey, flooding

Interpretive Group

Land capability classification: Joyuda—VIIIw; Atolladero—VIIIw; Bajura—VIIw

**LcE—La Covana-Limestone outcrop-Seboruco complex,
12 to 40 percent slopes**

Setting

Landscape: Hills

Landform: Ridges and hillslopes

Major uses: Wildlife habitat

Elevation: 80 to 750 feet

Composition

La Covana and similar soils: 60 percent

Limestone outcrop: 20 percent

Seboruco and similar soils: 15 percent

Dissimilar soils: 5 percent

Typical Profiles

La Covana

Surface layer:

0 to 5 inches—dark reddish brown gravelly clay

Subsoil:

5 to 19 inches—yellowish red extremely gravelly clay that has calcium carbonate concretions

19 to 31 inches—very pale brown indurated petrocalcic material

Substratum:

31 to 80 inches—very pale brown silt loam that has yellow mottles and calcium carbonate concretions

Limestone outcrop

Bedrock:

0 to 80 inches—hard, consolidated limestone bedrock from the Tertiary period

Seboruco

Surface layer:

0 to 2 inches—dusky red silty clay loam

Subsoil:

2 to 7 inches—dark reddish brown silty clay loam

7 to 11 inches—dark red gravelly silty clay that has common faint clay films on faces of peds

11 to 26 inches—reddish yellow gravelly silt loam that has pink, soft masses of calcium carbonate

Substratum:

26 to 31 inches—red loam that has pink, soft masses of calcium carbonate

Bedrock:

31 inches—hard, consolidated limestone bedrock

Minor Components

Dissimilar:

- Pitahaya soils that are in positions similar to those of the major soils but are shallow to fractured limestone bedrock

Soil Properties and Qualities

Depth class: La Covana—shallow; Seboruco—moderately deep

Depth to bedrock or hardpan: La Covana—6 to 20 inches; Seboruco—20 to 40 inches

Parent material: La Covana—material that weathered from limestone bedrock;

Seboruco—shallow marine sediments overlying limestone bedrock

Surface runoff: Very high

Drainage class: Well drained

Permeability: La Covana—very slow; Seboruco—slow

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: La Covana—20 to 60 percent, by volume, mostly pebbles and cobbles; Seboruco—less than 10 percent, by volume, mostly pebbles and cobbles

Extent of rock outcrop: Less than 20 percent

Shrink-swell potential: Low

Natural fertility: La Covana—low; Seboruco—moderate

Content of organic matter in the surface layer: La Covana—moderate to high;

Seboruco—moderate

Reaction: La Covana—slightly alkaline or moderately alkaline; Seboruco—moderately alkaline

Land Use

Dominant uses: Wildlife habitat

Other uses: Forestland

Agricultural Development

Cropland

Suitability: La Covana—unsuited; Seboruco—poorly suited

Management concerns: La Covana—depth to hardpan, slope; Seboruco—slope, very low available water capacity

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland

Commonly grown crops: Buffelgrass; guineagrass

Management concerns: La Covana—depth to hardpan, slope; Seboruco—slope

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: La Covana—depth to hardpan, slope; Seboruco—slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: La Covana—depth to cemented pan, slope; Seboruco—slope

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to a cemented pan.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: La Covana—depth to cemented pan, slope; Seboruco—slope

Management measures and considerations:

- The use of an alternate system should be considered.
- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: La Covana—depth to cemented pan, slope; Seboruco—slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the cemented pan help to overcome the restricted depth to the cemented pan.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: La Covana—depth to cemented pan, slope, small stones; Seboruco—slope

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or using the less sloping areas helps to overcome the slope limitation.
- A properly designed, alternate onsite sewage system can help to overcome the restricted depth to cemented pan.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: La Covana—slope, small stones; Seboruco—slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: La Covana—slope, small stones; Seboruco—slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope; small stones

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: La Covana—VIs; Seboruco—Vle

**LdA—La Luna silty clay loam, 0 to 2 percent slopes,
occasionally flooded**

Setting

Landscape: River valleys

Landform: Flood plains

Major uses: Cropland under drip irrigation

Elevation: Sea level to 50 feet

Composition

La Luna and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 11 inches—very dark grayish brown silty clay loam

Subsoil:

11 to 20 inches—very dark grayish brown silty clay loam

20 to 32 inches—very dark grayish brown silty clay that has light yellowish brown masses of calcium carbonate

32 to 44 inches—olive brown silty clay loam that has light yellowish brown masses of calcium carbonate

44 to 58 inches—dark grayish brown silty clay loam that has light yellowish brown masses of calcium carbonate

Substratum:

58 to 75 inches—dark grayish brown silty clay loam that has brown mottles and light yellowish brown masses of calcium carbonate

Minor Components

Dissimilar:

- Vayas soils, which are poorly drained and are in the lower positions

Similar:

- Cortada and San Antón soils, which are in the slightly higher positions and are moist for more than 3 months each year

Soil Properties and Qualities

Depth class: Very deep

Parent material: Alluvial deposits of mixed origin

Surface runoff: Negligible

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Very low or low

Seasonal high water table: None within a depth of 6 feet

Flooding: Occasional, very brief duration

Hazard of water erosion: Slight

Shrink-swell potential: Low

Natural fertility: High

Content of organic matter in the surface layer: High

Reaction: Slightly alkaline or moderately alkaline throughout

Land Use

Dominant uses: Cropland

Other uses: Naturalized pastureland; hayland

Agricultural Development

Cropland

Suitability: Suited

Commonly grown crops: Cash crops

Management concerns: Occasional flooding

Management measures and considerations:

- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Returning crop residue to the soil helps the soil to retain moisture.

Pasture and hayland

Suitability: Suited

Commonly grown crops: Kleberg's bluestem; hurricanegrass

Management concerns: Very low available water capacity

Management measures and considerations:

- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.

Naturalized pastureland

Suitability: Suited

Management concerns: Very low available water capacity

Management measures and considerations:

- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.

Urban Development

Dwellings

Suitability: Unsited

Management concerns: Flooding

Septic tank absorption fields

Suitability: Unsited

Management concerns: Flooding

Local roads and streets

Suitability: Unsited

Management concerns: Low strength; flooding

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Unsited

Management concerns: Flooding

Picnic areas

Suitability: Unsited

Management concerns: Flooding

Playgrounds

Suitability: Moderately suited

Management concerns: Flooding

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can raise the area above the flooding.

Paths and trails

Suitability: Suited

Management concerns: Flooding

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can raise the area above the flooding.

Interpretive Group

Land capability classification: IIc

LeF—La Tea-Limestone outcrop complex, 20 to 60 percent slopes

Setting

Landscape: Hills and mountains

Landform: Ridges, hillslopes, and mountain slopes

Major uses: Forestland

Elevation: 150 to 820 feet

Composition

La Tea and similar soils: 70 percent

Limestone outcrop: 20 percent

Dissimilar soils: 10 percent

Typical Profiles

La Tea

Surface layer:

0 to 5 inches—very dark grayish brown very cobbly clay

Subsoil:

5 to 11 inches—very dark grayish brown gravelly clay

11 to 16 inches—very dark grayish brown paragravelly clay

Bedrock:

16 to 18 inches—highly fractured, semiconsolidated limestone

18 inches—hard, consolidated limestone bedrock from the Cretaceous period

Limestone outcrop

Bedrock:

0 to 80 inches—hard, consolidated limestone bedrock from the Cretaceous period

Minor Components

Dissimilar:

- Humatas soils, which have a finer textured, deeper profile than the La Tea soil

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: 14 to 20 inches

Parent material: Colluvium and residuum that weathered from limestone bedrock

Surface runoff: Very high

Drainage class: Well drained

Permeability: Slow

Available water capacity: Moderate

Flooding: None

Hazard of water erosion: Very severe

Rock fragments in the surface layer: 30 to 45 percent, by volume, mostly pebbles and cobbles

Extent of rock outcrop: 20 percent

Shrink-swell potential: Low

Natural fertility: High

Content of organic matter in the surface layer: High

Reaction: Slightly alkaline or moderately alkaline throughout

Land Use

Dominant uses: Forestland

Other uses: Wildlife habitat

Agricultural Development (La Tea Soil)

Cropland

Suitability: Unsited

Management concerns: Depth to rock; slope

Pasture and hayland

Suitability: Unsited

Management concerns: Depth to rock; slope

Naturalized pastureland

Suitability: Unsited

Management concerns: Depth to rock; slope

Urban Development (La Tea Soil)

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The use of an alternate system should be considered.
- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development (La Tea Soil)

Camp areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Moderately suited or poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group (La Tea Soil)

Land capability classification: VIIe

LfC—Landfill, 0 to 8 percent slopes

Setting

Landscape: Hills and mountains

Landform: Hillslopes and mountain slopes

Composition

This map unit is a miscellaneous land type consisting of sanitary landfills. Areas of this map unit have been reworked by earthmoving operations and are used intensively for garbage disposal.

Soil Properties and Qualities

Because of the diversity of this map unit, onsite investigation is needed.

Minor Components

Some areas contain minor inclusions of the original soil material.

Land Use

Dominant uses: Sanitary landfill

Agricultural Development

Cropland

- This map unit is severely limited as cropland. A site that has better suited soils should be selected.

Pasture and hayland

- This map unit is severely limited as pasture and hayland. A site that has better suited soils should be selected.

Naturalized pastureland

- This map unit is severely limited as naturalized pastureland. A site that has better suited soils should be selected.

Urban Development

Dwellings

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as sites for dwellings.
- Onsite investigation is needed prior to construction.

Septic tank absorption fields

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as sites for septic tank absorption fields.

Local roads and streets

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as sites for local roads and streets.
- Onsite investigation is needed prior to construction.

Recreational Development

Camp areas

Suitability: Unsited

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as camp areas.

Picnic areas

Suitability: Unsited

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as picnic areas.

Playgrounds

Suitability: Unsited

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as sites for playgrounds.

Paths and trails

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as sites for paths and trails.

Interpretive Group

Land capability classification: VIII

LkB—Lares clay, 0 to 5 percent slopes

Setting

Landscape: Coastal plains

Landform: Alluvial fans and terraces

Major uses: Pasture and cropland

Elevation: 50 to 160 feet

Composition

Lares and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 2 inches—yellowish brown clay

Subsurface layer:

2 to 5 inches—yellowish red clay that has red mottles

Subsoil:

5 to 8 inches—yellowish red clay that has red mottles

8 to 28 inches—mottled red and strong brown clay

Substratum:

28 to 41 inches—mottled reddish yellow, strong brown, and light gray clay that has black iron-manganese concretions

41 to 50 inches—mottled reddish yellow and light gray clay loam that has black iron-manganese concretions

50 to 65 inches—mottled dark yellowish brown, pale yellow, and gray clay

65 to 82 inches—mottled dark yellowish brown and dark gray clay that has black iron-manganese concretions

Minor Components

Dissimilar:

- Bajura and Maní soils, which are poorly drained or somewhat poorly drained and are in the lower positions
- Coloso soils that are in positions similar to those of the Lares soil but have kaolinitic mineralogy
- Mabí soils that are in positions similar to those of the Lares soil but have a very high shrink-swell potential

Soil Properties and Qualities

Depth class: Very deep

Parent material: Clayey marine deposits

Surface runoff: Low

Drainage class: Somewhat poorly drained

Permeability: Moderately slow

Available water capacity: High

Seasonal high water table: None within a depth of 6 feet

Flooding: None

Hazard of water erosion: Moderate

Shrink-swell potential: Moderate

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate to high

Reaction: Very strongly acid in the surface and subsurface layers, very strongly acid to slightly acid in the subsoil, and very strongly acid or strongly acid in the substratum

Land Use

Dominant uses: Pasture

Other uses: Cropland

Agricultural Development

Cropland

Suitability: Suited

Commonly grown crops: Sugar cane; plantains

Management concerns: Slope; further erosion; soil acidity

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Restricting tillage to periods when the soil is not wet helps to prevent clodding and crusting.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Suited

Commonly grown crops: Pangola grass; merker grass

Management concerns: Slope; hazard of further erosion; soil acidity

Management measures and considerations:

- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Suited

Management concerns: Hazard of further erosion

Management measures and considerations:

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Shrink-swell potential

Management measures and considerations:

- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Slow permeability

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Too clayey; wetness

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Filling the selected area with suitable material from an offsite location can improve soil performance.

Picnic areas

Suitability: Poorly suited

Management concerns: Too clayey; wetness

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Filling the selected area with suitable material from an offsite location can improve soil performance.

Playgrounds

Suitability: Poorly suited

Management concerns: Too clayey; wetness

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Filling the selected area with suitable material from an offsite location can improve soil performance.

Paths and trails

Suitability: Poorly suited

Management concerns: Too clayey; wetness

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Filling the selected area with suitable material from an offsite location can improve soil performance.

Interpretive Group

Land capability classification: IIe

LnA—Llanos Costa loam, 0 to 2 percent slopes

Setting

Landscape: Uplands

Landform: Alluvial fans

Major uses: Hayland and pasture

Elevation: 33 to 164 feet

Composition

Llanos Costa and similar soils: 80 percent

Dissimilar soils: 20 percent

Typical Profile

Surface layer:

0 to 9 inches—dark brown loam

Subsoil:

9 to 15 inches—dark reddish brown gravelly clay loam

15 to 29 inches—yellowish red gravelly clay

29 to 43 inches—yellowish red very gravelly clay

43 to 56 inches—strong brown and yellowish red very gravelly sandy clay loam

56 to 68 inches—yellowish red very gravelly sandy clay loam

68 to 80 inches—yellowish red gravelly sandy clay loam

Minor Components

Dissimilar:

- Maguayo soils that are in positions similar to those of the Llanos Costa soil but do not have a gravelly subsoil

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Gravelly sediments that weathered from basalt, chert, and rhyolite

Surface runoff: Negligible to low

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Low

Seasonal high water table: None within a depth of 80 inches

Flooding: None

Hazard of water erosion: Slight or low

Rock fragments in the surface layer: Less than 15 percent, by volume, pebbles

Shrink-swell potential: Moderate

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Strongly acid to neutral throughout

Land Use

Dominant uses: Hayland

Other uses: Pasture; cropland

Agricultural Development

Cropland

Suitability: Moderately suited

Commonly grown crops: Vegetables; cash crops

Management concerns: Tilth; very low available water capacity

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.

Pasture and hayland

Suitability: Well suited

Commonly grown crops: Buffelgrass; guineagrass; hurricanegrass; Kleberg's bluestem

Management concerns: Weed competition

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Well suited

Management concerns: Weed competition

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Mechanical and chemical means can be used to help control competition from weeds.

Urban Development

Dwellings

Suitability: Moderately suited

Management concerns: Shrink-swell potential

Management measures and considerations:

- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Moderate permeability

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; shrink-swell potential

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.

Recreational Development

Camp areas

Suitability: Moderately suited

Management concerns: Moderate permeability

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Picnic areas

Suitability: Moderately suited

Management concerns: Moderate permeability

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Playgrounds

Suitability: Moderately suited

Management concerns: Moderate permeability

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Paths and trails

Suitability: Moderately suited

Management concerns: Moderate permeability

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Interpretive Group

Land capability classification: IIc

LnB—Llanos Costa loam, 2 to 5 percent slopes

Setting

Landscape: Uplands

Landform: Alluvial fans

Major uses: Hayland and pasture

Elevation: 33 to 164 feet

Composition

Llanos Costa and similar soils: 80 percent

Dissimilar soils: 20 percent

Typical Profile

Surface layer:

0 to 9 inches—dark brown loam

Subsoil:

9 to 15 inches—dark reddish brown gravelly clay loam

15 to 29 inches—yellowish red gravelly clay

29 to 43 inches—yellowish red very gravelly clay

43 to 56 inches—strong brown and yellowish red very gravelly sandy clay loam

56 to 68 inches—yellowish red very gravelly sandy clay loam

68 to 80 inches—yellowish red gravelly sandy clay loam

Minor Components

Dissimilar:

- Maguayo soils that are in positions similar to those of the Llanos Costa soil but do not have a gravelly subsoil

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Gravelly sediments that weathered from basalt, chert, and rhyolite

Surface runoff: Low

Drainage class: Well drained
Permeability: Moderate
Available water capacity: Low
Seasonal high water table: None within a depth of 80 inches
Flooding: None
Hazard of water erosion: Low
Rock fragments in the surface layer: Less than 15 percent, by volume, pebbles
Shrink-swell potential: Moderate
Natural fertility: Moderate
Content of organic matter in the surface layer: Moderate
Reaction: Strongly acid to neutral throughout

Land Use

Dominant uses: Hayland
Other uses: Pasture; cropland

Agricultural Development

Cropland

Suitability: Moderately suited
Commonly grown crops: Vegetables; cash crops
Management concerns: Tillage; very low available water capacity
Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tillage, and reduces the hazard of erosion.
- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.

Pasture and hayland

Suitability: Well suited
Commonly grown crops: Buffelgrass; guineagrass; hurricanegrass; Kleberg's bluestem
Management concerns: Weed competition
Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Well suited (fig. 12)
Management concerns: Weed competition
Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Mechanical and chemical means can be used to help control competition from weeds.



Figure 12.—Naturalized pastureland in an area of Llanos Costa loam, 2 to 5 percent slopes.

Urban Development

Dwellings

Suitability: Moderately suited

Management concerns: Shrink-swell potential

Management measures and considerations:

- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Moderate permeability

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; shrink-swell potential

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.

Recreational Development

Camp areas

Suitability: Moderately suited

Management concerns: Moderate permeability

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Picnic areas

Suitability: Moderately suited

Management concerns: Moderate permeability

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Playgrounds

Suitability: Moderately suited

Management concerns: Slope; moderate permeability

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- Filling the selected area with suitable material from an offsite location can improve soil performance.

Paths and trails

Suitability: Moderately suited

Management concerns: Moderate permeability

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Interpretive Group

Land capability classification: IIc

LnC—Llanos Costa loam, 5 to 12 percent slopes

Setting

Landscape: Uplands

Landform: Alluvial fans and mountain footslopes

Major uses: Pasture

Elevation: 33 to 164 feet

Composition

Llanos Costa and similar soils: 80 percent

Dissimilar soils: 20 percent

Typical Profile

Surface layer:

0 to 9 inches—dark brown loam

Subsoil:

9 to 15 inches—dark reddish brown gravelly clay loam

15 to 29 inches—yellowish red gravelly clay

29 to 43 inches—yellowish red very gravelly clay

43 to 56 inches—strong brown and yellowish red very gravelly sandy clay loam

56 to 68 inches—yellowish red very gravelly sandy clay loam

68 to 80 inches—yellowish red gravelly sandy clay loam

Minor Components

Dissimilar:

- Maguayo soils that are in positions similar to those of the Llanos Costa soil but do not have a gravelly subsoil

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Gravelly sediments that weathered from basalt, chert, and rhyolite

Surface runoff: Medium

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Very low

Seasonal high water table: None within a depth of 80 inches

Flooding: None

Hazard of water erosion: Moderate

Rock fragments in the surface layer: Less than 15 percent, by volume, pebbles

Shrink-swell potential: Moderate

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Strongly acid to neutral throughout

Land Use

Dominant uses: Pasture

Other uses: Naturalized pastureland

Agricultural Development

Cropland

Suitability: Moderately suited

Commonly grown crops: Vegetables; cash crops

Management concerns: Slope; tilth; very low available water capacity

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.

Pasture and hayland

Suitability: Well suited to pasture; moderately suited to hayland

Commonly grown crops: Buffelgrass; guineagrass; hurricanegrass; Kleberg's bluestem

Management concerns: Weed competition

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Well suited

Management concerns: Weed competition

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Mechanical and chemical means can be used to help control competition from weeds.

Urban Development

Dwellings

Suitability: Moderately suited

Management concerns: Shrink-swell potential; slope

Management measures and considerations:

- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Moderate permeability; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; shrink-swell potential

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.

Recreational Development

Camp areas

Suitability: Moderately suited

Management concerns: Slope; moderate permeability

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Filling the selected area with suitable material from an offsite location can improve soil performance.

Picnic areas

Suitability: Moderately suited

Management concerns: Slope; moderate permeability

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Filling the selected area with suitable material from an offsite location can improve soil performance.

Playgrounds

Suitability: Moderately suited

Management concerns: Slope; moderate permeability

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Filling the selected area with suitable material from an offsite location can improve soil performance.

Paths and trails

Suitability: Moderately suited

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Interpretive Group

Land capability classification: IIIc

LpG—Los Peñones-Limestone outcrop complex, 60 to 90 percent slopes

Setting

Landscape: Hills

Landform: Ridges and hillslopes

Major uses: Wildlife habitat

Elevation: 165 to 750 feet

Composition

Los Peñones and similar soils: 50 percent

Limestone outcrop: 40 percent

Dissimilar soils: 10 percent

Typical Profiles

Los Peñones

Surface layer:

0 to 8 inches—black mucky peat

Bedrock:

8 inches—hard, consolidated limestone bedrock from the Cretaceous period

Limestone outcrop

Bedrock:

0 to 80 inches—hard, consolidated limestone bedrock from the Cretaceous period

Minor Components

Dissimilar:

- Soils that have a clayey subsoil over limestone bedrock

Soil Properties and Qualities (Los Peñones Soil)

Depth class: Shallow

Depth to bedrock: Less than 15 inches

Parent material: Organic material overlying unweathered limestone bedrock

Surface runoff: Medium

Drainage class: Well drained

Permeability: Rapid

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Very severe

Rock fragments in the surface layer: Less than 5 percent, by volume, pebbles and cobbles

Extent of rock outcrop: 40 percent

Shrink-swell potential: Low

Natural fertility: High

Content of organic matter in the surface layer: High

Reaction: Moderately alkaline throughout

Land Use

Dominant uses: Wildlife habitat

Agricultural Development (Los Peñones Soil)

Cropland

Suitability: Unsited

Management concerns: Depth to rock; slope

Pasture and hayland

Suitability: Unsited

Management concerns: Depth to rock; slope

Naturalized pastureland

Suitability: Unsited

Management concerns: Depth to rock; slope

Urban Development (Los Peñones Soil)

Dwellings

Suitability: Unsited

Management concerns: Depth to rock; slope

Septic tank absorption fields

Suitability: Unsited

Management concerns: Depth to rock

Local roads and streets

Suitability: Unsited

Management concerns: Depth to rock; slope

Recreational Development (Los Peñones Soil)

Camp areas

Suitability: Unsited

Management concerns: Depth to rock; slope

Picnic areas

Suitability: Unsited

Management concerns: Depth to rock; slope

Playgrounds

Suitability: Unsited

Management concerns: Depth to rock; slope

Paths and trails

Suitability: Unsited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group (Los Peñones Soil)

Land capability classification: VIIIs

MaB—Mabí clay, 2 to 5 percent slopes, rarely flooded

Setting

Landscape: Coastal plains

Landform: Alluvial fans and terraces

Major uses: Pasture

Elevation: 80 to 265 feet

Composition

Mabí and similar soils: 70 percent

Dissimilar soils: 30 percent

Typical Profile

Surface layer:

0 to 7 inches—black clay

Subsoil:

7 to 16 inches—very dark gray clay that has yellowish red mottles

16 to 32 inches—very dark gray clay that has strong brown and olive gray mottles

32 to 41 inches—very dark gray clay that has strong brown mottles

41 to 50 inches—black clay that has yellowish red mottles

50 to 74 inches—dark grayish brown clay that has strong brown and olive gray mottles
and few fine iron-manganese concretions

Minor Components

Dissimilar:

- Montegrando soils, which are moderately well drained and are in the higher positions
- Coloso soils, which have kaolinitic mineralogy and are in the lower positions

Soil Properties and Qualities

Depth class: Very deep

Parent material: Alluvium and colluvium of mixed origin

Surface runoff: Medium

Drainage class: Somewhat poorly drained

Permeability: Slow

Available water capacity: High

Seasonal high water table: Perched, at a depth of 1½ to 3 feet from June through
October

Flooding: Rare

Hazard of water erosion: Moderate

Shrink-swell potential: Very high

Natural fertility: High

Content of organic matter in the surface layer: Moderate

Reaction: Strongly acid to neutral in the surface layer and moderately acid to slightly
alkaline in the subsoil

Land Use

Dominant uses: Pasture

Other uses: Naturalized pastureland

Agricultural Development

Cropland

Suitability: Well suited

Commonly grown crops: Sugar cane; cash crops

Management concerns: Tilt; slope

Management measures and considerations:

- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.
- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.

Pasture and hayland

Suitability: Well suited

Commonly grown crops: Pangola grass; guineagrass; merker grass

Management concerns: Tilth

Management measures and considerations:

- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Well suited

Management concerns: Tilth

Management measures and considerations:

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Unsited

Management concerns: Flooding; shrink-swell potential

Septic tank absorption fields

Suitability: Unsited

Management concerns: Flooding; very slow permeability

Local roads and streets

Suitability: Poorly suited

Management concerns: Shrink-swell potential; low strength

Management measures and considerations:

- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Poorly suited or unsited

Management concerns: Flooding; too clayey

Picnic areas

Suitability: Poorly suited or unsited

Management concerns: Flooding; too clayey

Playgrounds

Suitability: Poorly suited or unsited

Management concerns: Flooding; too clayey

Paths and trails

Suitability: Poorly suited

Management concerns: Too clayey

Interpretive Group

Land capability classification: 1lw

MbA—Maguayo very gravelly sandy clay loam, 0 to 2 percent slopes

Setting

Landscape: Uplands

Landform: Alluvial fans

Major uses: Hayland, pasture, and cropland

Elevation: 15 to 165 feet

Composition

Maguayo and similar soils: 80 percent

Dissimilar soils: 20 percent

Typical Profile

Surface layer:

0 to 6 inches—dark brown very gravelly sandy clay loam

6 to 12 inches—dark brown very gravelly coarse sandy loam

Subsoil:

12 to 22 inches—dark yellowish brown clay

22 to 35 inches—brown clay

35 to 48 inches—brown clay that has very pale brown, soft masses and threads of calcium carbonate

48 to 65 inches—strong brown clay that has very pale brown, soft masses and threads of calcium carbonate

Minor Components

Dissimilar:

- Llanos Costa soils that are in positions similar to those of the Maguayo soil but do not have secondary calcium carbonates in the profile
- Guayacán soils that are in positions similar to those of the Maguayo soil but have a coarser subsoil

Soil Properties and Qualities

Depth class: Very deep

Parent material: Alluvium and colluvium of mixed origin

Surface runoff: Low

Drainage class: Well drained

Permeability: Moderately slow

Available water capacity: Very low

Seasonal high water table: None within a depth of 80 inches

Flooding: None

Hazard of water erosion: Low

Rock fragments in the surface layer: 15 to 40 percent, by volume, pebbles

Shrink-swell potential: Moderate

Natural fertility: High

Content of organic matter in the surface layer: Moderate

Reaction: Moderately alkaline or slightly alkaline in the surface layer and slightly acid to moderately alkaline in the subsoil

Land Use

Dominant uses: Hayland

Other uses: Pasture; cropland

Agricultural Development

Cropland

Suitability: Well suited

Commonly grown crops: Cash crops; vegetables

Management concerns: Very low available water capacity; tilth

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.

Pasture and hayland

Suitability: Well suited

Commonly grown crops: Buffelgrass; Hurricanegrass; Kleberg's bluestem

Management concerns: Very low available water capacity; weed competition

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Well suited

Management concerns: Very low available water capacity

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Suited

Management concerns: Shrink-swell potential

Management measures and considerations:

- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Slow permeability

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; shrink-swell potential

Management measures and considerations:

- Removing as much of the layer that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Suited

Management concerns: Small stones

Management measures and considerations:

- The use of suitable fill material from an offsite location should be considered.
- Removing the gravelly surface layer and increasing the thickness of the base aggregate improve soil performance.

Picnic areas

Suitability: Suited

Management concerns: Small stones

Management measures and considerations:

- The use of suitable fill material from an offsite location should be considered.
- Removing the gravelly surface layer and increasing the thickness of the base aggregate improve soil performance.

Playgrounds

Suitability: Poorly suited

Management concerns: Small stones

Management measures and considerations:

- The use of suitable fill material from an offsite location should be considered.
- Removing the gravelly surface layer and increasing the thickness of the base aggregate improve soil performance.

Paths and trails

Suitability: Moderately suited

Management concerns: Small stones

Management measures and considerations:

- Removing the gravelly surface layer and increasing the thickness of the base aggregate improve soil performance.

Interpretive Group

Land capability classification: IIc

MbC—Maguayo very gravelly sandy clay loam, 2 to 12 percent slopes

Setting

Landscape: Uplands

Landform: Alluvial fans

Major uses: Hayland, pasture, and cropland

Elevation: 15 to 165 feet

Composition

Maguayo and similar soils: 80 percent

Dissimilar soils: 20 percent

Typical Profile

Surface layer:

0 to 6 inches—dark brown very gravelly sandy clay loam

6 to 12 inches—dark brown very gravelly coarse sandy loam

Subsoil:

12 to 22 inches—dark yellowish brown clay

22 to 35 inches—brown clay

35 to 48 inches—brown clay that has very pale brown, soft masses and threads of calcium carbonate

48 to 65 inches—strong brown clay that has very pale brown, soft masses and threads of calcium carbonate

Minor Components

Dissimilar:

- Llanos Costa soils that are in positions similar to those of the Maguayo soil but do not have secondary calcium carbonates in the profile
- Guayacán soils that are in positions similar to those of the Maguayo soil but have a coarser subsoil

Soil Properties and Qualities

Depth class: Very deep

Parent material: Alluvium and colluvium of mixed origin

Surface runoff: Medium

Drainage class: Well drained

Permeability: Moderately slow

Available water capacity: Very low

Seasonal high water table: None within a depth of 80 inches

Flooding: None

Hazard of water erosion: Moderate

Rock fragments in the surface layer: 15 to 40 percent, by volume, pebbles

Shrink-swell potential: Moderate

Natural fertility: High

Content of organic matter in the surface layer: Moderate

Reaction: Moderately alkaline or slightly alkaline in the surface layer and slightly acid to moderately alkaline in the subsoil

Land Use

Dominant uses: Hayland

Other uses: Pasture; cropland

Agricultural Development

Cropland

Suitability: Suited

Commonly grown crops: Cash crops; vegetables

Management concerns: Very low available water capacity; tilth; slope

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and compaction.

Pasture and hayland

Suitability: Suited

Commonly grown crops: Buffelgrass; Hurricanegrass; Kleberg's bluestem

Management concerns: Very low available water capacity; weed competition

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Mechanical and chemical means can be used to help control competition from weeds.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and compaction of the soil surface.
- Using perennial grasses and legumes in rotation helps to penetrate and breakup the clayey root zone.

Naturalized pastureland

Suitability: Suited

Management concerns: Very low available water capacity

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Suited

Management concerns: Shrink-swell potential; slope

Management measures and considerations:

- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Slow to moderate permeability; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; shrink-swell potential

Management measures and considerations:

- Removing as much of the layer that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Moderately suited

Management concerns: Small stones; slope

Management measures and considerations:

- The use of suitable fill material from an offsite location should be considered.
- A properly designed, alternate septic system should be used.
- Removing the gravelly surface layer and increasing the thickness of the base aggregate improve soil performance.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Moderately suited

Management concerns: Small stones; slope

Management measures and considerations:

- The use of suitable fill material from an offsite location should be considered.
- Removing the gravelly surface layer and increasing the thickness of the base aggregate improve soil performance.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Small stones; slope

Management measures and considerations:

- The use of suitable fill material from an offsite location should be considered.
- Removing the gravelly surface layer and increasing the thickness of the base aggregate improve soil performance.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Paths and trails

Suitability: Moderately suited

Management concerns: Small stones

Management measures and considerations:

- Removing the gravelly surface layer and increasing the thickness of the base aggregate improve soil performance.

Interpretive Group

Land capability classification: IIIc

McF—Malaya clay, 20 to 60 percent slopes

Setting

Landscape: Hills and mountains

Landform: Hillslopes and mountain slopes

Major uses: Wildlife habitat

Elevation: 325 to 980 feet

Composition

Malaya and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 4 inches—brown clay

Subsoil:

4 to 10 inches—brown gravelly clay

Bedrock:

10 to 14 inches—highly fractured, calcareous tuffaceous rock

14 to 72 inches—semiconsolidated, calcareous tuffaceous rock

Minor Components

Dissimilar:

- Caguabo and Múcara soils that are in positions similar to those of the Malaya soil but are shallow to moderately deep to volcanic bedrock
- La Tea soils that are in positions similar to those of the Malaya soil but are shallow to limestone bedrock
- Scattered areas of calcareous, tuffaceous rock outcrop

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: 5 to 16 inches

Parent material: Residuum and colluvium that weathered from calcareous, tuffaceous bedrock

Surface runoff: High

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Moderate to very severe

Rock fragments in the surface layer: Less than 25 percent, by volume, mostly pebbles

Extent of rock outcrop: Less than 10 percent

Shrink-swell potential: Low

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderately low or moderate

Reaction: Slightly acid to moderately alkaline in the surface layer and neutral to moderately alkaline in the subsoil

Land Use

Dominant uses: Wildlife habitat

Other uses: Forestland

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Pigeonpeas; coffee; taniers

Management concerns: Depth to rock; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland

Commonly grown crops: Guineagrass; pangola grass

Management concerns: Erosion

Management measures and considerations:

- Erosion is a concern in unprotected areas.

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Depth to rock; slope; low strength

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: VIIIs

MDA—Manglillo, Boquerón, and Serrano soils, very frequently flooded

Setting

Landscape: Coastal plains

Landform: Manglillo—salt marshes; Boquerón—tidal flats and marshes; Serrano—tidal flats

Major uses: Wildlife habitat

Elevation: Sea level to 20 feet

Composition

Manglillo and similar soils: 50 percent

Boquerón and similar soils: 30 percent

Serrano and similar soils: 20 percent

Typical Profiles

Manglillo

Surface layer:

0 to 5 inches—black muck

Subsurface layer:

5 to 24 inches—dark brown and very dark brown mucky peat

Underlying material:

24 to 43 inches—dark greenish gray mucky loam

43 to 60 inches—light greenish gray and greenish gray sandy loam

Boquerón

Surface layer:

0 to 2 inches—very dark gray muck

2 to 4 inches—dark grayish brown silty clay that has olive brown mottles

Underlying material:

4 to 8 inches—black and very dark gray mucky clay loam

8 to 12 inches—dark gray silty clay that has red and yellowish red mottles

12 to 55 inches—dark gray silty clay

55 to 80 inches—greenish gray clay that has olive brown mottles

Serrano

Surface layer:

0 to 3 inches—olive gray sandy loam

Subsoil:

3 to 14 inches—greenish gray loam

Underlying material:

14 to 22 inches—greenish gray very gravelly loam

22 to 65 inches—dark greenish gray extremely gravelly loamy sand

Minor Components

Dissimilar:

- Bahía Salinas soils, which are excessively drained
- Teresa soils, which are somewhat poorly drained and are saline

Soil Properties and Qualities

Depth class: Very deep

Parent material: Manglillo—decomposed organic material overlying regolith consisting of sand-size shell fragments, quartz grains, and subrounded volcanic fragments from recent beach deposits; Boquerón—clayey, alluvial and marine sediments; Serrano—moderately fine material over coarse-textured sediments

Surface runoff: Negligible

Drainage class: Manglillo—very poorly drained; Boquerón—very poorly drained; Serrano—poorly drained

Permeability: Manglillo—rapid; Boquerón—slow; Serrano—rapid

Available water capacity: Manglillo—very low; Boquerón—high; Serrano—very low

Seasonal high water table: Manglillo—either under water or flooded by high tides from July through October; Boquerón—either under water or flooded by high tides from July through October; Serrano—apparent, at a depth of 2½ to 3½ feet from May through November

Flooding: Manglillo—frequent, long duration; Boquerón—frequent, brief duration; Serrano—frequent, brief duration

Hazard of water erosion: Slight

Shrink-swell potential: Manglillo—low; Boquerón—high; Serrano—low

Natural fertility: Manglillo—high; Boquerón—high; Serrano—Low

Content of organic matter in the surface layer: Manglillo—high; Boquerón—high; Serrano—moderate

Reaction: Moderately alkaline

Land Use

Dominant uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Manglillo—seasonal wetness; Boquerón—seasonal wetness; Serrano—seasonal wetness, too sandy

Pasture and hayland

Suitability: Unsited

Management concerns: Manglillo—seasonal wetness; Boquerón—seasonal wetness; Serrano—seasonal wetness, too sandy

Naturalized pastureland

Suitability: Unsited

Management concerns: Manglillo—seasonal wetness; Boquerón—seasonal wetness; Serrano—seasonal wetness, too sandy

Urban Development

Dwellings

Suitability: Unsited

Management concerns: Manglillo—subsidence, wetness; Boquerón—wetness, shrink-swell potential; Serrano—wetness

Septic tank absorption fields

Suitability: Unsited

Management concerns: Manglillo—subsidence, wetness; Boquerón—slow permeability, wetness; Serrano—wetness

Local roads and streets

Suitability: Unsited

Management concerns: Manglillo—subsidence, wetness; Boquerón—wetness, shrink-swell potential, low strength; Serrano—wetness

Recreational Development

Camp areas

Suitability: Unsited

Management concerns: Manglillo—wetness, excess humus; Boquerón—too clayey, wetness; Serrano—too sandy, wetness

Picnic areas

Suitability: Unsited

Management concerns: Manglillo—wetness, excess humus; Boquerón—too clayey, wetness; Serrano—too sandy, wetness

Playgrounds

Suitability: Unsited

Management concerns: Manglillo—wetness, excess humus; Boquerón—too clayey, wetness; Serrano—too sandy, wetness

Paths and trails

Suitability: Unsited

Management concerns: Manglillo—wetness, excess humus; Boquerón—too clayey, wetness; Serrano—too sandy, wetness

Interpretive Group

Land capability classification: Manglillo—VIII; Boquerón—VIIw; Serrano—VIIc

MeA—Maní clay, 0 to 2 percent slopes, occasionally flooded

Setting

Landscape: River valleys

Landform: Flood plains

Major uses: Pasture

Elevation: Sea level to 90 feet

Composition

Maní and similar soils: 80 percent

Dissimilar soils: 20 percent

Typical Profile

Surface layer:

0 to 13 inches—brown clay

Subsoil:

13 to 29 inches—brown clay that has yellowish brown, gray, and olive mottles and masses of iron-manganese

29 to 41 inches—grayish brown clay that has brown and greenish gray mottles and masses of iron-manganese

Underlying material:

41 to 90 inches—light olive gray clay that has brown and greenish gray mottles

Minor Components

Dissimilar:

- Lares soils, which are in the higher positions and have a finer textured profile than the Maní soil

Soil Properties and Qualities

Depth class: Very deep

Parent material: Fine textured alluvium of mixed origin

Surface runoff: Negligible

Drainage class: Somewhat poorly drained

Permeability: Very slow to moderately slow

Available water capacity: High

Seasonal high water table: Apparent, at a depth of 2 to 4 feet from July through October

Flooding: Occasional, brief duration

Hazard of water erosion: Slight

Shrink-swell potential: High

Natural fertility: Moderate to high

Content of organic matter in the surface layer: Moderate to high

Reaction: Moderately acid or slightly acid throughout

Land Use

Dominant uses: Pasture

Other uses: Cropland

Agricultural Development

Cropland

Suitability: Well suited

Commonly grown crops: Sugar cane; bananas; plantains

Management concerns: Flooding; tilth

Management measures and considerations:

- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.
- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients and the content of organic matter.
- Implementing a drainage measure, such as surface drainage, tile drainage, land grading, or drainage channels, helps to control wetness in the root zone during wet periods.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.

Pasture and hayland

Suitability: Suited

Commonly grown crops: Merker grass; elephant grass; para grass; African star grass; pangola grass

Management concerns: Flooding; tilth

Management measures and considerations:

- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.

- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and root damage and help to maintain productivity and tilth.
- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients and the content of organic matter.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Mechanical and chemical means can be used to help control competition from weeds.
- Implementing a drainage measure, such as surface drainage, tile drainage, land grading, or drainage channels, helps to control wetness in the root zone during wet periods.

Naturalized pastureland

Suitability: Suited

Management concerns: Flooding

Management measures and considerations:

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and root damage and help to maintain productivity and tilth.
- Implementing a drainage measure, such as surface drainage, tile drainage, land grading, or drainage channels, helps to control wetness in the root zone during wet periods.
- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Unsited

Management concerns: Flooding; shrink-swell potential

Septic tank absorption fields

Suitability: Unsited

Management concerns: Flooding; slow permeability

Local roads and streets

Suitability: Poorly suited

Management concerns: Shrink-swell potential; low strength; flooding

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Unsited

Management concerns: Flooding; too clayey

Picnic areas

Suitability: Unsited

Management concerns: Flooding; too clayey; slow permeability

Playgrounds

Suitability: Unsited

Management concerns: Flooding; too clayey

Paths and trails

Suitability: Unsited

Management concerns: Flooding; too clayey

Interpretive Group

Land capability classification: 1lw

MfF—Maresúa gravelly clay loam, 20 to 60 percent slopes

Setting

Landscape: Hills and mountains

Landform: Ridges, hillslopes, and mountain slopes

Major uses: Forestland

Elevation: 160 to 1,480 feet

Composition

Maresúa and similar soils: 80 percent

Dissimilar soils: 20 percent

Typical Profile

Surface layer:

0 to 1 inch—leaves, needles, twigs, sticks, bark, and decomposed organic material

1 to 4 inches—very dark grayish brown gravelly clay loam

Subsurface layer:

4 to 10 inches—very dark grayish brown extremely gravelly clay loam that has dark reddish brown stains and coatings

Subsoil:

10 to 26 inches—dark reddish brown extremely paragravelly clay

Bedrock:

26 to 46 inches—soft, semiconsolidated serpentinite bedrock

46 inches—hard, consolidated serpentinite bedrock

Minor Components

Dissimilar:

- El Cacique and La Taína soils that are in positions similar to those of the Maresúa soil but are shallow to serpentinite bedrock
- Caguabo and Múcara soils that are in positions similar to those of the Maresúa soil but are shallow to moderately deep to volcanic bedrock

Similar:

- Less sloping Maresúa soils

Soil Properties and Qualities

Depth class: Moderately deep

Depth to bedrock: 40 to 60 inches

Parent material: Clayey residuum and colluvium that weathered from serpentinite bedrock

Surface runoff: High

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Moderate

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: 5 to 80 percent, by volume, pebbles and cobbles

Shrink-swell potential: Low in the surface layer; moderate in the subsoil

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate to high

Reaction: Neutral throughout

Land Use

Dominant uses: Forestland

Other uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Poorly suited

Management concerns: Slope; too gravelly

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland

Commonly grown crops: Guineagrass; pangola grass

Management concerns: Erosion; slope; weed competition

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Preparing seedbeds on the contour or across the slope helps to control erosion and increases the rate of germination.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Shrink-swell potential; slope

Management measures and considerations:

- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope; slow permeability

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Shrink-swell potential; slope

Management measures and considerations:

- Removing as much of the layer that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope; small stones

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: VIIe

MgF—Maresúa-Serpentinite outcrop complex, 40 to 60 percent slopes

Setting

Landscape: Hills and mountains

Landform: Hillslopes and mountain slopes

Major uses: Naturalized pastureland

Elevation: 160 to 1,150 feet

Composition

Maresúa and similar soils: 40 percent

Serpentinite outcrop: 40 percent

Dissimilar soils: 20 percent

Typical Profiles

Maresúa

Surface layer:

0 to 1 inch—leaves, needles, twigs, sticks, bark, and decomposed organic material

1 to 4 inches—very dark grayish brown gravelly clay loam

Subsurface layer:

4 to 10 inches—very dark grayish brown extremely gravelly clay loam that has dark reddish brown stains and coatings on faces of peds and pores

Subsoil:

10 to 26 inches—dark reddish brown extremely paragravelly clay

Bedrock:

26 to 46 inches—soft, semiconsolidated serpentinite bedrock

46 inches—hard, consolidated serpentinite bedrock

Rock outcrop

Bedrock:

0 to 80 inches—serpentinite

Minor Components

Dissimilar:

- El Cacique and La Taína soils that are in positions similar to those of the Maresúa soil but are shallow to serpentinite bedrock

Properties and Qualities (Maresúa Soil)

Depth class: Moderately deep

Depth to bedrock: 40 to 60 inches

Parent material: Clayey residuum and colluvium that weathered from serpentinite bedrock

Surface runoff: High

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Moderate

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: From 5 to 80 percent, by volume, mostly pebbles and cobbles

Extent of rock outcrop: 40 percent

Shrink-swell potential: Low in the surface layer; moderate in the subsoil

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate to high

Reaction: Neutral throughout

Land Use

Dominant uses: Naturalized pastureland

Other uses: Wildlife habitat

Agricultural Development (Maresúa soil)

Cropland

Suitability: Unsited

Management concerns: Depth to rock; slope

Pasture and hayland

Suitability: Unsited

Management concerns: Depth to rock; slope

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development (Maresúa soil)

Dwellings

Suitability: Poorly suited

Management concerns: Shrink-swell potential; slope

Management measures and considerations:

- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope; slow permeability

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Shrink-swell potential; depth to rock; slope

Management measures and considerations:

- Removing as much of the layer that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development (Maresúa soil)

Camp areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling, designing structures to conform to the contour of the natural slope, or using the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling or using the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope; small stones

Management measures and considerations:

- Cutting and filling or using the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group (Maresúa soil)

Land capability classification: Vlle

MiD—Mariana gravelly clay loam, 12 to 20 percent slopes

Setting

Landscape: Hills

Landform: Ridges and hillslopes

Major uses: Cropland

Elevation: 95 to 430 feet

Composition

Mariana and similar soils: 95 percent

Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 8 inches—brown gravelly clay loam

Subsurface layer:

8 to 15 inches—dark brown gravelly clay loam

Subsoil:

15 to 26 inches—mottled yellowish red and reddish brown clay

26 to 33 inches—mottled strong brown, pinkish gray, and dark yellowish brown clay

33 to 50 inches—mottled light gray, strong brown, and dark red silty clay

Substratum:

50 to 60 inches—mottled white and strong brown saprolite that has a texture of silty clay

Minor Components

Dissimilar:

- A soil that is shallower to saprolite than the Mariana soils and is in the steepest areas

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Colluvium and residuum that weathered from basalt lava and tuff

Surface runoff: Medium

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Moderate

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: 15 to 32 percent, by volume, pebbles

Shrink-swell potential: Moderate

Natural fertility: Low to moderate

Content of organic matter in the surface layer: Moderately low or moderate

Reaction: Very strongly acid or extremely acid throughout

Land Use

Dominant uses: Cropland

Other uses: Naturalized pastureland

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Cash crops; pineapples

Management concerns: Erosion; soil fertility; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and compaction.
- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.

Pasture and hayland

Suitability: Suited to pasture; poorly suited to hayland

Commonly grown crops: African star grass; guineagrass; pangola grass; buffelgrass;

Angleton bluestem; smut grass; mesquite grass; Mexican bluegrass

Management concerns: Erosion; slope; weed competition

Management measures and considerations:

- Erosion is a concern in unprotected areas.

- The moderately steep slopes increase the difficulty of management.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Biodegradable or synthetic ground covers should be used to protect eroded areas.
- Preparing seedbeds on the contour or across the slope helps to control erosion and increases the rate of germination.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Mechanical and chemical means can be used to help control competition from weeds.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and compaction.
- Good pasture management that includes controlled and deferred grazing is needed to prevent overgrazing, and reseeding is needed occasionally to minimize erosion.

Naturalized pastureland

Suitability: Suited

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The moderately steep slopes increase the difficulty of management.
- Overgrazed areas should be reestablished and then protected from further overgrazing.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Good pasture management that includes controlled and deferred grazing is needed to prevent overgrazing, and reseeding is needed occasionally to minimize erosion.

Urban Development

Dwellings

Suitability: Moderately suited or poorly suited

Management concerns: Shrink-swell potential; slope

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.
- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately suited or poorly suited

Management concerns: Permeability; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Moderately suited or poorly suited

Management concerns: Low strength; shrink-swell potential; slope

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.
- Removing as much of the layer that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope; small stones

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: IVe

MiE—Mariana gravelly clay loam, 20 to 40 percent slopes

Setting

Landscape: Hills

Landform: Hillslopes

Major uses: Naturalized pastureland

Elevation: 95 to 430 feet

Composition

Mariana and similar soils: 95 percent

Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 8 inches—brown gravelly clay loam

Subsurface layer:

8 to 15 inches—dark brown gravelly clay loam

Subsoil:

15 to 26 inches—mottled yellowish red and reddish brown clay

26 to 33 inches—mottled strong brown, pinkish gray, and dark yellowish brown clay

33 to 50 inches—mottled light gray, strong brown, and dark red silty clay

Substratum:

50 to 60 inches—mottled white and strong brown saprolite that has a texture of silty clay

Minor Components

Dissimilar:

- A soil that is shallower to saprolite than the Mariana soils and is in the steepest areas

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Colluvium and residuum that weathered from basalt lava and tuff

Surface runoff: High

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Moderate

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: 15 to 32 percent, by volume, pebbles

Shrink-swell potential: Moderate

Natural fertility: Low to moderate

Content of organic matter in the surface layer: Moderately low or moderate

Reaction: Very strongly acid or extremely acid throughout

Land Use

Dominant uses: Naturalized pastureland

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Erosion; slope

Pasture and hayland

Suitability: Poorly suited to pasture; unsited to hayland

Commonly grown crops: African star grass; guineagrass; pangola grass; buffelgrass;

Angleton bluestem; smut grass; mesquite grass; Mexican bluegrass

Management concerns: Erosion; slope

Management measures and considerations:

- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Biodegradable or synthetic ground covers should be used to protect eroded areas.
- Good pasture management that includes controlled and deferred grazing is needed to prevent overgrazing, and reseeding is needed occasionally to minimize erosion.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Erosion; slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

- Good pasture management that includes controlled and deferred grazing is needed to prevent overgrazing, and reseeding is needed occasionally to minimize erosion.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Shrink-swell potential; slope

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.
- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.
- Moisture-control measures can be used to prevent problems associated with the shrinking and swelling of the soil.

Septic tank absorption fields

Suitability: Poorly suited or unsuited

Management concerns: Slow permeability; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; slope; shrink-swell potential

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.
- Removing as much of the layer that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.

Recreational Development

Camp areas

Suitability: Poorly suited or unsuited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited or unsuited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Unsuited

Management concerns: Slope; small stones

Paths and trails

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place, thereby reducing the hazard of erosion on paths and trails.

Interpretive Group

Land capability classification: VIe

MkF—Maricao clay, 20 to 60 percent slopes

Setting

Landscape: Mountain ranges

Landform: Ridges and mountain slopes

Major uses: Cropland and forestland

Elevation: 2,460 to 3,609 feet

Composition

Maricao and similar soils: 80 percent

Dissimilar soils: 20 percent

Typical Profile

Surface layer:

0 to 5 inches—dark brown clay

Subsurface layer:

5 to 11 inches—dark reddish brown clay

Subsoil:

11 to 29 inches—dark reddish brown clay

29 to 35 inches—red clay that has iron-manganese concretions and saprolite-like material

35 to 46 inches—red silty clay loam that has iron-manganese concretions and saprolite-like material

Substratum:

46 to 65 inches—mottled red, reddish brown, yellowish brown, and brownish yellow clay loam that has iron-manganese concretions

Minor Components

Dissimilar:

- Cuchillas soils, which do not have an argillic horizon, have a coarser textured profile than the Maricao soil, and are moderately deep to volcanic rock
- Agüeybaná soils that are in positions similar to those of the Maricao soil but have a solum that is 60 to 80 inches thick

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Residuum that weathered from basalt

Surface runoff: High

Drainage class: Well drained

Permeability: Moderate

Available water capacity: High

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: Less than 5 percent, by volume

Shrink-swell potential: Moderate

Natural fertility: Low

Content of organic matter in the surface layer: Moderately low or moderate

Reaction: Extremely acid to strongly acid in the surface and subsurface layers and very strongly acid or strongly acid in the subsoil and substratum

Land Use

Dominant uses: Cropland

Other uses: Forestland; wildlife habitat

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Coffee; plantains; bananas; oranges; taniens; yams

Management concerns: Erosion; soil fertility; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Moderately suited to pasture; unsuited to hayland

Commonly grown crops: African star grass; pangola grass

Management concerns: Erosion; slope; weed competition

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The steep and very steep slopes increase the difficulty of management.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Preparing seedbeds on the contour or across the slope helps to control erosion and increases the rate of germination.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The steep and very steep slopes increase the difficulty of management.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; slope

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Too clayey; slope; too acid

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Too clayey; slope; too acid

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: VIe

MkG—Maricao clay, 60 to 90 percent slopes

Setting

Landscape: Mountain ranges
Landform: Mountain slopes
Major uses: Wildlife habitat and forestland
Elevation: 2,460 to 3,609 feet

Composition

Maricao and similar soils: 80 percent
Dissimilar soils: 20 percent

Typical Profile

Surface layer:
0 to 5 inches—dark brown clay

Subsurface layer:
5 to 11 inches—dark reddish brown clay

Subsoil:
11 to 29 inches—dark reddish brown clay
29 to 35 inches—red clay that has iron-manganese concretions and saprolite-like material
35 to 46 inches—red silty clay loam that has iron-manganese concretions and saprolite-like material

Substratum:
46 to 65 inches—mottled red, reddish brown, yellowish brown, and brownish yellow clay loam that has iron-manganese concretions

Minor Components

- Dissimilar:*
- Cuchillas soils, which do not have an argillic horizon, have a coarser textured profile than the Maricao soil, and are moderately deep to volcanic rock
 - Agüeybaná soils that are in positions similar to those of the Maricao soil but have a solum that is 60 to 80 inches thick

Soil Properties and Qualities

Depth class: Very deep
Depth to bedrock: More than 80 inches
Parent material: Residuum that weathered from basalt
Surface runoff: High
Drainage class: Well drained
Permeability: Moderate
Available water capacity: High
Flooding: None
Hazard of water erosion: Severe
Rock fragments in the surface layer: Less than 5 percent, by volume
Shrink-swell potential: Moderate
Natural fertility: Low
Content of organic matter in the surface layer: Moderately low or moderate
Reaction: Extremely acid to strongly acid in the surface and subsurface layers and very strongly acid or strongly acid in the subsoil and substratum

Land Use

Dominant uses: Wildlife habitat
Other uses: Forestland

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Coffee; plantains; bananas; oranges

Management concerns: Erosion; soil fertility; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland

Commonly grown crops: African star grass; pangola grass

Management concerns: Erosion; slope; weed competition

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Preparing seedbeds on the contour or across the slope helps to control erosion and increases the rate of germination.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Unsuited

Management concerns: Slope

Septic tank absorption fields

Suitability: Unsuited

Management concerns: Slope

Local roads and streets

Suitability: Poorly suited or unsuited

Management concerns: Low strength; slope

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Unsited

Management concerns: Slope

Picnic areas

Suitability: Unsited

Management concerns: Slope

Playgrounds

Suitability: Unsited

Management concerns: Slope

Paths and trails

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: Vlle

MnA—Melones clay, 0 to 2 percent slopes

Setting

Landscape: Coastal plains

Landform: Alluvial fans

Major uses: Hayland, pasture, and wildlife habitat

Elevation: Sea level to 100 feet

Composition

Melones and similar soils: 95 percent

Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 7 inches—dark brown clay

Subsoil:

7 to 18 inches—brown clay

18 to 37 inches—dark brown clay that has pinkish white, soft masses of calcium carbonate

37 to 46 inches—brown clay that has pinkish white, soft masses of calcium carbonate

46 to 66 inches—brown clay

66 to 70 inches—strong brown gravelly clay loam

Substratum:

70 to 80 inches—yellowish brown clay

Minor Components

Dissimilar:

- Maguayo soils that are in positions similar to those of the Melones soil but have a decrease in clay content of 20 percent or more with increasing depth in the upper 60 inches

- Guayacán soils, which have a coarser textured profile than the Melones soil and are in the higher positions
- Llanos Costa soils that are in positions similar to those of the Melones soil but do not have masses of calcium carbonate

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Loamy and clayey, alluvial and marine sediments

Surface runoff: Medium

Drainage class: Well drained

Permeability: Slow

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Slight

Rock fragments in the surface layer: Less than 10 percent, by volume, pebbles

Shrink-swell potential: High

Natural fertility: High

Content of organic matter in the surface layer: Moderate

Reaction: Slightly alkaline or moderately alkaline in the surface layer and the upper part of the subsoil and moderately alkaline in the lower part of the subsoil and in the substratum

Land Use

Dominant uses: Hayland

Other uses: Pasture; cropland; wildlife habitat

Agricultural Development

Cropland

Suitability: Well suited

Commonly grown crops: Cash crops; vegetables

Management concerns: Very low available water capacity; tilth

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.

Pasture and hayland

Suitability: Well suited

Commonly grown crops: Buffelgrass; Hurricanegrass; Kleberg's bluestem

Management concerns: Very low available water capacity; weed competition

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Well suited

Management concerns: Very low available water capacity

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Shrink-swell potential

Management measures and considerations:

- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Slow permeability

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; shrink-swell potential

Management measures and considerations:

- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Moderately suited

Management concerns: Too clayey

Management measures and considerations:

- The use of suitable fill material from an offsite location should be considered.
- A properly designed, alternate septic system should be used.

Picnic areas

Suitability: Moderately suited

Management concerns: Too clayey

Management measures and considerations:

- The use of suitable fill material from an offsite location should be considered.

Playgrounds

Suitability: Moderately suited

Management concerns: Too clayey

Management measures and considerations:

- The use of suitable fill material from an offsite location should be considered.

Paths and trails

Suitability: Moderately suited

Management concerns: Low strength; shrink-swell potential

Management measures and considerations:

- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Interpretive Group

Land capability classification: IIc

MnC—Melones clay, 2 to 12 percent slopes

Setting

Landscape: Coastal plains

Landform: Alluvial fans

Major uses: Hayland, pasture, and wildlife habitat

Elevation: 50 to 120 feet

Composition

Melones and similar soils: 95 percent

Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 7 inches—dark brown clay

Subsoil:

7 to 18 inches—brown clay

18 to 37 inches—dark brown clay that has pinkish white, soft masses of calcium carbonate

37 to 46 inches—brown clay that has pinkish white, soft masses of calcium carbonate

46 to 66 inches—brown clay

66 to 70 inches—strong brown gravelly clay loam

Substratum:

70 to 80 inches—yellowish brown clay

Minor Components

Dissimilar:

- Maguayo soils that are in positions similar to those of the Melones soil but have a decrease in clay content of 20 percent or more with increasing depth in the upper 60 inches
- Guayacán soils that are in positions similar to those of the Melones soil but have a coarser textured profile
- Llanos Costa soils that are in positions similar to those of the Melones soil but do not have masses of calcium carbonate

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Loamy and clayey, alluvial and marine sediments

Surface runoff: Medium

Drainage class: Well drained

Permeability: Slow

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: Less than 10 percent, by volume

Shrink-swell potential: High

Natural fertility: High

Content of organic matter in the surface layer: Moderate

Reaction: Slightly alkaline or moderately alkaline in the surface layer and the upper part of the subsoil and moderately alkaline in the lower part of the subsoil and in the substratum

Land Use

Dominant uses: Hayland

Other uses: Pasture; cropland; wildlife habitat

Agricultural Development

Cropland

Suitability: Moderately suited or poorly suited

Commonly grown crops: Cash crops; vegetables

Management concerns: Very low available water capacity; tilth; slope

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.

Pasture and hayland

Suitability: Moderately suited

Commonly grown crops: Buffelgrass; hurricanegrass; Kleberg's bluestem

Management concerns: Very low available water capacity; weed competition

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Mechanical and chemical means can be used to help control competition from weeds.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.
- Using perennial grasses and legumes in rotation helps to penetrate and breakup the clayey root zone.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Very low available water capacity

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Shrink-swell potential

Management measures and considerations:

- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Slow permeability

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; shrink-swell potential

Management measures and considerations:

- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Moderately suited

Management concerns: Too clayey

Management measures and considerations:

- The use of suitable fill material from an offsite location should be considered.
- A properly designed, alternate septic system should be used.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Moderately suited

Management concerns: Too clayey

Management measures and considerations:

- The use of suitable fill material from an offsite location should be considered.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Moderately suited

Management concerns: Too clayey

Management measures and considerations:

- The use of suitable fill material from an offsite location should be considered.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Moderately suited

Management concerns: Low strength; shrink-swell potential

Management measures and considerations:

- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Interpretive Group

Land capability classification: IIIc

MoB—Montalva clay, 0 to 5 percent slopes

Setting

Landscape: Uplands and low hills

Landform: Alluvial fans

Major uses: Naturalized pastureland

Elevation: 5 to 80 feet

Composition

Montalva and similar soils: 80 percent

Dissimilar soils: 20 percent

Typical Profile

Surface layer:

0 to 6 inches—very dark grayish brown clay

Subsoil:

6 to 16 inches—dark brown clay

16 to 29 inches—dark brown clay

29 to 32 inches—dark brown paragravelly sandy clay loam

Bedrock:

32 inches—moderately weathered, semiconsolidated bedded volcanic rock

Minor Components

Dissimilar:

- El Papayo soils, which are in the higher positions and have hard, consolidated volcanic rock at a depth of 10 to 20 inches
- Melones soils, which do not have highly fractured, semiconsolidated volcanic rock in the upper 80 inches and are in the lower positions

Soil Properties and Qualities

Depth class: Moderately deep

Depth to bedrock: 20 to 40 inches

Parent material: Colluvium and residuum of mixed origin overlying basic volcanic bedrock

Surface runoff: Medium

Drainage class: Well drained

Permeability: Moderately slow

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Slight to moderate

Rock fragments in the surface layer: Less than 20 percent, by volume, pebbles

Shrink-swell potential: High

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Neutral to slightly alkaline throughout

Land Use

Dominant uses: Naturalized pastureland

Other uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Cash crops; vegetables

Management concerns: Very low available water capacity; tilth

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.

Pasture and hayland

Suitability: Moderately suited

Commonly grown crops: Kleberg's bluestem; hurricanegrass

Management concerns: Very low available water capacity; weed competition

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Mechanical and chemical means can be used to help control competition from weeds.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.
- Using perennial grasses and legumes in rotation helps to penetrate and breakup the clayey root zone.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Very low available water capacity

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Shrink-swell potential

Management measures and considerations:

- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slow permeability

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; shrink-swell potential

Management measures and considerations:

- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Well suited

Picnic areas

Suitability: Well suited

Playgrounds

Suitability: Moderately suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The use of suitable fill material from an offsite location should be considered.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Moderately suited

Management concerns: Low strength; shrink-swell potential

Management measures and considerations:

- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Interpretive Group

Land capability classification: IIc

MoC—Montalva clay, 5 to 12 percent slopes

Setting

Landscape: Uplands and low hills

Landform: Alluvial fans and hillslopes

Major uses: Naturalized pastureland

Elevation: 80 to 165 feet

Composition

Montalva and similar soils: 80 percent

Dissimilar soils: 20 percent

Typical Profile

Surface layer:

0 to 6 inches—very dark grayish brown clay

Subsoil:

6 to 29 inches—dark brown clay

29 to 32 inches—dark brown paragravelly sandy clay loam

Bedrock:

32 inches—moderately weathered, semiconsolidated bedded volcanic rock

Minor Components

Dissimilar:

- El Papayo soils that are in positions similar to those of the Montalva soil but have hard, consolidated volcanic rock at a depth of 10 to 20 inches

Similar:

- Montalva soils that have a thinner surface layer

Soil Properties and Qualities

Depth class: Moderately deep

Depth to bedrock: 20 to 40 inches

Parent material: Colluvium and residuum of mixed origin overlying basic volcanic bedrock

Surface runoff: High

Drainage class: Well drained

Permeability: Moderately slow

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Moderate to severe

Rock fragments in the surface layer: Less than 20 percent, by volume

Shrink-swell potential: High

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Neutral to slightly alkaline throughout

Land Use

Dominant uses: Naturalized pastureland

Other uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Pigeonpeas

Management concerns: Very low available water capacity; tilth; slope

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.

Pasture and hayland

Suitability: Moderately suited or poorly suited

Commonly grown crops: Kleberg's bluestem; hurricanegrass

Management concerns: Erodibility; slope; weed competition; very low available water capacity

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.

- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Mechanical and chemical means can be used to help control competition from weeds.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.
- Using perennial grasses and legumes in rotation helps to penetrate and breakup the clayey root zone.

Naturalized pastureland

Suitability: Moderately suited or poorly suited

Management concerns: Erodibility; slope; weed competition; very low available water capacity

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Shrink-swell potential

Management measures and considerations:

- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slow permeability

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; shrink-swell potential

Management measures and considerations:

- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Moderately suited

Management concerns: Slope; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- The use of suitable fill material from an offsite location should be considered.

Picnic areas

Suitability: Moderately suited

Management concerns: Slope; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- The use of suitable fill material from an offsite location should be considered.

Playgrounds

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- The use of suitable fill material from an offsite location should be considered.

Paths and trails

Suitability: Moderately suited

Management concerns: Low strength; shrink-swell potential

Management measures and considerations:

- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Interpretive Group

Land capability classification: IIIc

MqC—Montegrando clay, 2 to 12 percent slopes

Setting

Landscape: Uplands

Landform: Alluvial fans and low hills

Major uses: Naturalized pastureland and cropland

Elevation: 50 to 165 feet

Composition

Montegrando and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 6 inches—dark yellowish brown clay

6 to 10 inches—dark grayish brown clay that has black concretions

Subsoil:

10 to 14 inches—dark yellowish brown clay that has black manganese concretions and yellowish brown and gray mottles

14 to 24 inches—yellowish brown clay that has black manganese concretions, calcium carbonate concretions, and gray mottles

Underlying material:

24 to 32 inches—yellowish brown gravelly clay that has black manganese concretions and grayish brown and gray mottles

32 to 60 inches—gray gravelly clay that has black manganese concretions, calcium carbonate concretions, and yellowish brown and gray mottles

Minor Components

Dissimilar:

- Maní soils, which are in the lower positions and are somewhat poorly drained

Soil Properties and Qualities

Depth class: Very deep

Parent material: Stratified alluvial sediments over gravelly colluvium

Surface runoff: Medium

Drainage class: Somewhat poorly drained

Permeability: Moderately slow

Available water capacity: High

Seasonal high water table: Apparent, at a depth of 2 to 5 feet from July through September

Flooding: None

Hazard of water erosion: Moderate

Rock fragments in the surface layer: Less than 5 percent, by volume, pebbles

Shrink-swell potential: Very high

Natural fertility: High

Content of organic matter in the surface layer: Moderate or moderately low

Reaction: Strongly acid to moderately alkaline in the surface layer and the upper part of the subsoil and neutral to moderately alkaline in the lower part of the subsoil

Land Use

Dominant uses: Naturalized pastureland

Other uses: Cropland; pasture; hayland

Agricultural Development

Cropland

Suitability: Well suited

Commonly grown crops: Sugar cane; bananas; plantains; corn

Management concerns: Slope; seasonal wetness; tillth; weed competition

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.
- Implementing a drainage measure, such as surface drainage, tile drainage, land grading, or drainage channels, helps to control wetness in the root zone during wet periods.
- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients and the content of organic matter.

Pasture and hayland

Suitability: Well suited

Commonly grown crops: Merker grass; elephant grass; para grass; African star grass; carpet grass-sour paspalum; pangola grass

Management concerns: Slope; seasonal wetness; weed competition

Management measures and considerations:

- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity during the establishment, maintenance, or renovation of hayland and pasture.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

- Implementing a drainage measure, such as surface drainage, tile drainage, land grading, or drainage channels, helps to control wetness in the root zone during wet periods.
- Preparing seedbeds on the contour or across the slope helps to control erosion and increases the rate of germination.
- Good pasture management that includes controlled and deferred grazing is needed to prevent overgrazing, and reseeding is needed occasionally to minimize erosion.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Well suited

Commonly grown crops: Guineagrass; para grass; carpet grass-sour paspalum

Management concerns: Slope

Management measures and considerations:

- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity during the establishment, maintenance, or renovation of pasture.
- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Good pasture management that includes controlled and deferred grazing is needed to prevent overgrazing, and reseeding is needed occasionally to minimize erosion.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Shrink-swell potential

Management measures and considerations:

- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Wetness; restricted permeability

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Shrink-swell potential

Management measures and considerations:

- Removing as much of the layer that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Permeability; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- The highest points on the landscape are the best camp areas.
- Areas of this map unit should not be used as camp sites during wet periods.

Picnic areas

Suitability: Poorly suited

Management concerns: Permeability; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Paths and trails

Suitability: Poorly suited

Management concerns: Too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Interpretive Group

Land capability classification: IIIe

MrD—Morado clay loam, 12 to 20 percent slopes

Setting

Landscape: Hills and mountains

Landform: Hillslopes and mountain slopes

Major uses: Naturalized pastureland

Elevation: 80 to 1,640 feet

Composition

Morado and similar soils: 85 percent

Dissimilar soils: 15 percent

Typical Profile

Surface layer:

0 to 5 inches—very dark gray clay loam

Subsoil:

5 to 16 inches—very dark gray clay

16 to 21 inches—dark brown clay loam

Bedrock:

21 to 31 inches—highly fractured, moderately weathered volcanic bedrock

31 inches—fractured, unweathered volcanic bedrock

Minor Components

Dissimilar:

- Volcanic rock outcrop on summits of hills or mountains

Soil Properties and Qualities

Depth class: Moderately deep

Depth to bedrock: 20 to 29 inches

Parent material: Residuum that weathered from basalt flow and tuff

Surface runoff: Medium

Drainage class: Well drained

Permeability: Moderate

Soil Survey of San Germán Area, Puerto Rico

Available water capacity: Moderate

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: Less than 15 percent, by volume, mostly pebbles

Shrink-swell potential: Low

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Content of organic matter in the subsoil: Low or very low

Reaction: Moderately acid to neutral throughout

Land Use

Dominant uses: Naturalized pastureland

Other uses: Pasture

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Pigeonpeas; coffee; citrus; bananas; plantains; sweet potatoes; taniens; cash crops

Management concerns: Depth to rock; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and compaction.
- Returning crop residue to the soil improves tilth and the retention of soil moisture and increases the content of organic matter and the supply of plant nutrients.
- A good cropping system and other management practices are needed to control erosion and thereby maintain the supply of plant nutrients, the content of organic matter, and the available water capacity.

Pasture and hayland

Suitability: Moderately suited to pasture; unsuited to hayland

Commonly grown crops: Guineagrass; elephant grass; merker grass; pangola grass; sorghum

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The moderately steep slopes increase the difficulty of management.
- Returning crop residue to the soil improves tilth and the retention of soil moisture and increases the content of organic matter and the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.
- Preparing seedbeds on the contour or across the slope helps to control erosion and increases the rate of germination.

- Good pasture management that includes controlled and deferred grazing is needed to prevent overgrazing, and reseeding is needed occasionally to minimize erosion.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Suited

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The moderately steep slopes increase the difficulty of management.
- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity during the establishment, maintenance, or renovation of pasture.
- Good pasture management that includes controlled and deferred grazing is needed to prevent overgrazing, and reseeding is needed occasionally to minimize erosion.

Urban Development

Dwellings

Suitability: Suited to poorly suited

Management concerns: Slope; depth to rock

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Cutting and filling, designing structures to conform to the contour of the natural slope, or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; slope

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Suited to poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Picnic areas

Suitability: Suited to poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Using the less sloping areas helps to overcome the slope limitation.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Using the less sloping areas helps to overcome the slope limitation.

Paths and trails

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Designing paths and trails to conform to the contour minimizes erosion.

Interpretive Group

Land capability classification: IVe

MrE—Morado clay loam, 20 to 40 percent slopes

Setting

Landscape: Hills and mountains

Landform: Hillslopes and mountain slopes

Major uses: Naturalized pastureland

Elevation: 80 to 1,640 feet

Composition

Morado and similar soils: 85 percent

Dissimilar soils: 15 percent

Typical Profile

Surface layer:

0 to 5 inches—very dark gray clay loam

Subsoil:

5 to 16 inches—very dark gray clay

16 to 21 inches—dark brown clay loam

Bedrock:

21 to 31 inches—highly fractured, moderately weathered volcanic bedrock

31 inches—fractured, unweathered volcanic bedrock

Minor Components

Dissimilar:

- Volcanic rock outcrop on summits of hills or mountains

Soil Properties and Qualities

Depth class: Moderately deep

Depth to bedrock: 20 to 29 inches

Parent material: Residuum that weathered from basalt flow and tuff

Surface runoff: High

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Moderate

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: Less than 15 percent, by volume, mostly pebbles

Shrink-swell potential: Low

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Content of organic matter in the subsoil: Low or very low

Reaction: Moderately acid to neutral throughout

Land Use

Dominant uses: Naturalized pastureland

Other uses: Pasture; woodland; wildlife

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Pigeonpeas; coffee; citrus; bananas; plantains; subsistence crops

Management concerns: Depth to rock; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and compaction.
- Returning crop residue to the soil improves tilth and the retention of soil moisture and increases the content of organic matter and the supply of plant nutrients.
- A good cropping system and other management practices are needed to control erosion and thereby maintain the supply of plant nutrients, the content of organic matter, and the available water capacity.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland

Commonly grown crops: Guineagrass; elephant grass; merker grass; pangola grass; paragrass; carpet grass-sour paspalum

Management concerns: Erosion; slope

Management measures and considerations:

- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.
- Preparing seedbeds on the contour or across the slope helps to control erosion and increases the rate of germination.
- Good pasture management that includes controlled and deferred grazing is needed to prevent overgrazing, and reseeding is needed occasionally to minimize erosion.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The steep slopes increase the difficulty of management.
- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity during the establishment, maintenance, or renovation of pasture.
- Good pasture management that includes controlled and deferred grazing is needed to prevent overgrazing, and reseeding is needed occasionally to minimize erosion.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling, designing structures to conform to the contour of the natural slope, or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Suited

Management concerns: Low strength; slope

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited or unsuited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Picnic areas

Suitability: Poorly suited or unsuited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Playgrounds

Suitability: Poorly suited or unsuited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Paths and trails

Suitability: Poorly suited or unsuited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Designing paths and trails to conform to the contour minimizes erosion.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Interpretive Group

Land capability classification: VIe

MrF—Morado clay loam, 40 to 60 percent slopes

Setting

Landscape: Hills and mountains

Landform: Hillslopes and mountain slopes

Major uses: Naturalized pastureland

Elevation: 80 to 1,640 feet

Composition

Morado and similar soils: 85 percent

Dissimilar soils: 15 percent

Typical Profile

Surface layer:

0 to 5 inches—very dark gray clay loam

Subsoil:

5 to 16 inches—very dark gray clay

16 to 21 inches—dark brown clay loam

Bedrock:

21 to 31 inches—highly fractured, moderately weathered volcanic bedrock

31 inches—fractured, unweathered volcanic bedrock

Minor Components

Dissimilar:

- Volcanic rock outcrop on summits of hills or mountains

Similar:

- Morado soils that have slopes of 60 to 90 percent

Soil Properties and Qualities

Depth class: Moderately deep

Depth to bedrock: 20 to 29 inches

Parent material: Residuum that weathered from basalt flow and tuff

Surface runoff: High
Drainage class: Well drained
Permeability: Moderate
Available water capacity: Moderate
Flooding: None
Hazard of water erosion: Severe
Rock fragments in the surface layer: Less than 15 percent, by volume, mostly pebbles
Shrink-swell potential: Low
Natural fertility: Moderate
Content of organic matter in the surface layer: Moderate
Content of organic matter in the subsoil: Low or very low
Reaction: Moderately acid to neutral throughout

Land Use

Dominant uses: Naturalized pastureland
Other uses: Forestland

Agricultural Development

Cropland

Suitability: Poorly suited
Commonly grown crops: Pigeonpeas; coffee; citrus; bananas; plantains; subsistence crops
Management concerns: Slope; depth to rock
Management measures and considerations:

- Most of the commonly grown crops are harvested on the lower part of the slope, and the cultivation is done by hand.
- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and compaction.
- Returning crop residue to the soil improves tilth and the retention of soil moisture and increases the content of organic matter and the supply of plant nutrients.
- A good cropping system and other management practices are needed to control erosion and thereby maintain the supply of plant nutrients, the content of organic matter, and the available water capacity.

Pasture and hayland

Suitability: Unsited
Commonly grown crops: Guineagrass; elephant grass; merker grass; pangola grass; paragrass; carpet grass-sour paspalum
Management concerns: Erosion; slope

Naturalized pastureland

Suitability: Poorly suited or unsited
Management concerns: Erosion; slope
Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling, designing structures to conform to the contour of the natural slope, or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; slope

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Unsited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Picnic areas

Suitability: Unsited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Playgrounds

Suitability: Unsited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Paths and trails

Suitability: Poorly suited or unsited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Designing paths and trails to conform to the contour minimizes erosion.

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Interpretive Group

Land capability classification: VIIe

MuC—Múcara loam, 5 to 12 percent slopes

Setting

Landscape: Hills and mountains

Landform: Hillslopes and mountain slopes

Major uses: Naturalized pastureland

Elevation: 80 to 1,640 feet

Composition

Múcara and similar soils: 80 percent

Dissimilar soils: 20 percent

Typical Profile

Surface layer:

0 to 5 inches—dark olive brown loam

Subsoil:

5 to 12 inches—olive brown loam

12 to 18 inches—olive brown fine sandy loam

Substratum:

18 to 32 inches—mottled olive brown, light yellowish brown, and light brownish gray
gravelly sandy loam

Bedrock:

32 inches—slightly weathered, fractured volcanic rock

Minor Components

Dissimilar:

- Caguabo soils that are in positions similar to those of the Múcara soil but are shallow to bedrock

Soil Properties and Qualities

Depth class: Moderately deep

Depth to bedrock: 20 to 40 inches

Parent material: Residuum that weathered from volcanic rock

Surface runoff: Medium

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Moderate

Flooding: None

Hazard of water erosion: Moderate

Rock fragments in the surface layer: Less than 15 percent, by volume, pebbles

Shrink-swell potential: High in the surface layer

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Slightly alkaline to strongly acid throughout

Land Use

Dominant uses: Naturalized pastureland

Other uses: Cropland

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Starchy crops

Management concerns: Depth to rock; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, contour stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.

Pasture and hayland

Suitability: Moderately suited

Commonly grown crops: Merker grass; pangola grass

Management concerns: Erodibility; slope

Management measures and considerations:

- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Erodibility; slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Moderately suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Moderately suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: IIIe

MuD—Múcara loam, 12 to 20 percent slopes

Setting

Landscape: Hills and mountains

Landform: Hillslopes and mountain slopes

Major uses: Naturalized pastureland

Elevation: 80 to 1,640 feet

Composition

Múcara and similar soils: 80 percent

Dissimilar soils: 20 percent

Typical Profile

Surface layer:

0 to 5 inches—dark olive brown loam

Subsoil:

5 to 12 inches—olive brown loam

12 to 18 inches—olive brown fine sandy loam

Substratum:

18 to 32 inches—mottled olive brown, light yellowish brown, and light brownish gray
gravelly sandy loam

Bedrock:

32 inches—slightly weathered, fractured volcanic rock

Minor Components

Dissimilar:

- Caguabo soils that are in positions similar to those of the Múcara soil but are shallow to bedrock

Soil Properties and Qualities

Depth class: Moderately deep

Depth to bedrock: 20 to 40 inches

Parent material: Residuum that weathered from volcanic rock

Surface runoff: Medium

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Moderate

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: Less than 15 percent, by volume, mostly pebbles

Shrink-swell potential: High in the surface layer

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Slightly alkaline to strongly acid throughout

Land Use

Dominant uses: Naturalized pastureland

Other uses: Cropland

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Pigeonpeas; coffee; citrus; bananas; plantains

Management concerns: Depth to rock; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.

Pasture and hayland

Suitability: Moderately suited to pasture; unsuited to hayland

Commonly grown crops: Merker grass; pangola grass

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The moderately steep slopes increase the difficulty of management.
- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The moderately steep slopes increase the difficulty of management.
- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Moderately suited or poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Moderately suited or poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: IVe

MuE—Múcara loam, 20 to 40 percent slopes

Setting

Landscape: Hills and mountains

Landform: Hillslopes and mountain slopes

Major uses: Naturalized pastureland

Elevation: 80 to 1,640 feet

Composition

Múcara and similar soils: 80 percent

Dissimilar soils: 20 percent

Typical Profile

Surface layer:

0 to 5 inches—dark olive brown loam

Subsoil:

5 to 12 inches—olive brown loam

12 to 18 inches—olive brown fine sandy loam

Substratum:

18 to 32 inches—mottled olive brown, light yellowish brown, and light brownish gray
gravelly sandy loam

Bedrock:

32 inches—slightly weathered, fractured volcanic rock

Minor Components

Dissimilar:

- Caguabo soils that are in positions similar to those of the Múcara soil but are shallow to bedrock
- Scattered areas of volcanic rock outcrop

Soil Properties and Qualities

Depth class: Moderately deep

Depth to bedrock: 20 to 40 inches

Parent material: Residuum that weathered from volcanic rock

Surface runoff: Very high

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Moderate

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: Less than 15 percent, by volume, mostly pebbles

Shrink-swell potential: High in the surface layer

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Slightly alkaline to strongly acid throughout

Land Use

Dominant uses: Naturalized pastureland

Other uses: Cropland

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Pigeonpeas; coffee; citrus; bananas; plantains

Management concerns: Depth to rock; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland

Commonly grown crops: Pangola grass

Management concerns: Erodibility; slope

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Erodibility; slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: Vle

MuF—Múcara loam, 40 to 60 percent slopes

Setting

Landscape: Mountains

Landform: Mountain slopes

Major uses: Naturalized pastureland

Elevation: 80 to 1,640 feet

Composition

Múcara and similar soils: 80 percent

Dissimilar soils: 20 percent

Typical Profile

Surface layer:

0 to 5 inches—dark olive brown loam

Subsoil:

5 to 12 inches—olive brown loam

12 to 18 inches—olive brown fine sandy loam

Substratum:

18 to 32 inches—mottled olive brown, light yellowish brown, and light brownish gray
gravelly sandy loam

Bedrock:

32 inches—slightly weathered, fractured volcanic rock

Minor Components

Dissimilar:

- Caguabo soils that are in positions similar to those of the Múcara soil but are shallow to bedrock
- Scattered areas of volcanic rock outcrop

Soil Properties and Qualities

Depth class: Moderately deep

Depth to bedrock: 20 to 40 inches

Parent material: Residuum that weathered from volcanic rock

Surface runoff: Very high

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Moderate

Flooding: None

Hazard of water erosion: Severe or very severe

Rock fragments in the surface layer: Less than 15 percent, by volume, mostly pebbles

Extent of rock outcrop: Less than 10 percent

Shrink-swell potential: High in the surface layer

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Slightly alkaline to strongly acid throughout

Land Use

Dominant uses: Naturalized pastureland

Other uses: Cropland

Agricultural Development

Cropland

Suitability: Poorly suited or unsuited

Commonly grown crops: Coffee; citrus

Management concerns: Depth to rock; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.

Pasture and hayland

Suitability: Poorly suited or unsuited to pasture; unsuited to hayland

Commonly grown crops: Pangola grass

Management concerns: Erodibility; slope

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Erodibility; slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: VIIe

NpD—Nipe clay, 5 to 20 percent slopes

Setting

Landscape: Hills and mountains

Landform: Ridges

Major uses: Urban development and forestland

Elevation: 164 to 2,130 feet

Composition

Nipe and similar soils: 95 percent

Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 2 inches—undecomposed plant material

2 to 11 inches—dusky red clay that has iron-manganese concretions

Subsoil:

11 to 31 inches—dusky red clay that has iron-manganese concretions

31 to 43 inches—dusky red clay

43 to 80 inches—dusky red silty clay

Minor Components

Dissimilar:

- Delicias soils, which have a coarser textured profile than the Nipe soil and are in the lower positions
- Rosario soils, which are moderately deep to serpentinite bedrock and are in the more sloping areas

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Iron-rich residuum that weathered from serpentinite bedrock

Surface runoff: Medium

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Moderate or high

Flooding: None

Hazard of water erosion: Moderate

Rock fragments in the surface layer: Less than 5 percent, by volume

Shrink-swell potential: Low

Natural fertility: Low

Content of organic matter in the surface layer: Moderately low or moderate

Reaction: Moderately acid to very strongly acid throughout

Land Use

Dominant uses: Urban development

Other uses: Forestland

Agricultural Development

Cropland

Suitability: Poorly suited

Management concerns: Soil fertility

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Moderately suited to pasture; poorly suited to hayland

Commonly grown crops: Guineagrass; Merker grass; pangola grass; African star grass

Management concerns: Erosion; slope; weed competition

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The moderately steep slopes increase the difficulty of management.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Preparing seedbeds on the contour or across the slope helps to control erosion and increases the rate of germination.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The moderately steep slopes increase the difficulty of management.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Suited

Management concerns: Slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; slope

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Too clayey

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: IVe

OrA—Olivares muck, ponded

Setting

Landscape: Coastal plains

Landform: Alluvial flats and depressions

Major uses: Wildlife habitat

Elevation: Sea level to 40 feet

Composition

Olivares and similar soils: 95 percent

Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 2 inches—black muck

Substratum:

2 to 25 inches—dark brown silty clay that has strong brown mottles

25 to 48 inches—dark olive silty clay that has dark yellowish brown mottles

48 to 80 inches—dark olive brown silty clay

Minor Components

Dissimilar:

- Cartagena and Teresa soils, which are somewhat poorly drained and are in the higher positions

Soil Properties and Qualities

Depth class: Very deep

Parent material: Loamy and clayey, alluvial and marine sediments

Surface runoff: Negligible

Drainage class: Very poorly drained

Permeability: Slow

Available water capacity: High

Seasonal high water table: Perched, at the surface to 1 foot above the surface from

August through November

Hazard of water erosion: Slight

Shrink-swell potential: Moderate

Natural fertility: High

Content of organic matter in the surface layer: High

Reaction: Moderately alkaline throughout

Land Use

Dominant uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Seasonal wetness; tilth

Pasture and hayland

Suitability: Unsited

Management concerns: Seasonal wetness; tilth

Naturalized pastureland

Suitability: Unsited

Management concerns: Seasonal wetness

Urban Development

Dwellings

Suitability: Unsited

Management concerns: Seasonal wetness; shrink-swell potential

Septic tank absorption fields

Suitability: Unsited

Management concerns: Seasonal wetness; restricted permeability

Local roads and streets

Suitability: Unsited

Management concerns: Shrink-swell potential; low strength; seasonal wetness

Recreational Development

Camp areas

Suitability: Unsited

Management concerns: Seasonal wetness

Picnic areas

Suitability: Unsited

Management concerns: Seasonal wetness

Playgrounds

Suitability: Unsited

Management concerns: Seasonal wetness

Paths and trails

Suitability: Unsited

Management concerns: Seasonal wetness

Interpretive Group

Land capability classification: VIIw

PaA—Palmarejo loam, 0 to 2 percent slopes

Setting

Landscape: Coastal plains

Landform: Alluvial fans

Major uses: Hayland

Elevation: Sea level to 165 feet

Composition

Palmarejo and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 9 inches—dark brown loam

Subsoil:

9 to 18 inches—mottled yellowish brown and dark brown clay

18 to 30 inches—yellowish brown clay that has dark yellowish brown mottles

30 to 41 inches—mottled yellowish brown and white clay loam

Substratum:

41 to 60 inches—mottled red and white sandy clay loam that has black manganese concretions

Minor Components

Dissimilar:

- Fraternidad soils, which have a very high shrink-swell potential and are in the lower positions
- Mariana soils, which are moderately deep to saprolite and are in the higher positions

Soil Properties and Qualities

Depth class: Very deep

Parent material: Sediments that weathered from volcanic bedrock

Surface runoff: Low

Drainage class: Moderately well drained

Permeability: Moderate

Available water capacity: High

Seasonal high water table: None within a depth of 6 feet

Flooding: None

Hazard of water erosion: Slight

Shrink-swell potential: Low

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Extremely acid or very strongly acid throughout

Land Use

Dominant uses: Hayland

Other uses: Pasture; cropland

Agricultural Development

Cropland

Suitability: Well suited

Commonly grown crops: Sugar cane; cash crops; pineapples; mangoes; papaya; avocados; pigeonpeas; corn

Management concerns: Tilth

Management measures and considerations:

- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and compaction.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Returning crop residue to the soil improves tilth and the retention of soil moisture and increases the content of organic matter and the supply of plant nutrients.
- A good cropping system and other management practices are needed to control erosion and thereby maintain the supply of plant nutrients, the content of organic matter, and the available water capacity.
- The soil should not be plowed so deeply that heavy clay from the subsoil is mixed with the surface layer.

Pasture and hayland

Suitability: Well suited

Commonly grown crops: African star grass; buffelgrass; hurricanegrass; Kleberg's bluestem; guineagrass; elephant grass; sorghum

Management concerns: Tilth

Management measures and considerations:

- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.
- Good pasture management that includes controlled and deferred grazing is needed to prevent overgrazing, and reseeding is needed occasionally to minimize erosion.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Well suited

Management concerns: Tilth

Management measures and considerations:

- Good pasture management that includes controlled and deferred grazing is needed to prevent overgrazing, and reseeding is needed occasionally to minimize erosion.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity during the establishment, maintenance, or renovation of pasture.

Urban Development

Dwellings

Suitability: Moderately suited

Management concerns: Shrink-swell potential

Management measures and considerations:

- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately suited

Management concerns: Slow permeability

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; shrink-swell potential

Management measures and considerations:

- Identify and removing the low strength layer and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Removing as much of the layer that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.

Recreational Development

Camp areas

Suitability: Well suited

Picnic areas

Suitability: Well suited

Playgrounds

Suitability: Well suited

Paths and trails

Suitability: Well suited

Interpretive Group

Land capability classification: IIc

PaB—Palmarejo loam, 2 to 5 percent slopes

Setting

Landscape: Coastal plains

Landform: Alluvial fans

Major uses: Hayland

Elevation: Sea level to 165 feet

Composition

Palmarejo and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 9 inches—dark brown loam

Subsoil:

9 to 18 inches—mottled yellowish brown and dark brown clay

18 to 30 inches—yellowish brown clay that has dark yellowish brown mottles

30 to 41 inches—mottled yellowish brown and white clay loam

Substratum:

41 to 60 inches—mottled red and white sandy clay loam that has black manganese concretions

Minor Components

Dissimilar:

- Fraternidad soils, which have a very high shrink-swell potential and are in the lower positions
- Mariana soils, which are moderately deep to saprolite and are in the higher positions

Soil Properties and Qualities

Depth class: Very deep

Parent material: Sediments that weathered from volcanic bedrock

Surface runoff: Low

Drainage class: Moderately well drained

Permeability: Moderate

Available water capacity: High

Seasonal high water table: None within a depth of 6 feet

Flooding: None

Hazard of water erosion: Slight

Shrink-swell potential: Low

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Extremely acid or very strongly acid throughout

Land Use

Dominant uses: Hayland

Other uses: Pasture; cropland

Agricultural Development

Cropland

Suitability: Well suited

Commonly grown crops: Sugar cane; cash crops; pineapples; mangoes; papaya; avocados; pigeonpeas; corn

Management concerns: Tilth

Management measures and considerations:

- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and compaction.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Returning crop residue to the soil improves tilth and the retention of soil moisture and increases the content of organic matter and the supply of plant nutrients.
- A good cropping system and other management practices are needed to control erosion and thereby maintain the supply of plant nutrients, the content of organic matter, and the available water capacity.
- The soil should not be plowed so deeply that heavy clay from the subsoil is mixed with the surface layer.

Pasture and hayland

Suitability: Well suited

Commonly grown crops: African star grass; buffelgrass; hurricanegrass; Kleberg's bluestem; guineagrass; elephant grass; sorghum

Management concerns: Tilth

Management measures and considerations:

- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.

- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.
- Good pasture management that includes controlled and deferred grazing is needed to prevent overgrazing, and reseeding is needed occasionally to minimize erosion.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Well suited

Management concerns: Tilth

Management measures and considerations:

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.
- Good pasture management that includes controlled and deferred grazing is needed to prevent overgrazing, and reseeding is needed occasionally to minimize erosion.
- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity during the establishment, maintenance, or renovation of pasture.

Urban Development

Dwellings

Suitability: Moderately suited

Management concerns: Shrink-swell potential

Management measures and considerations:

- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Moderately suited

Management concerns: Moderate permeability

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; shrink-swell potential

Management measures and considerations:

- Identify and removing the low strength layer and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Removing as much of the layer that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.

Recreational Development

Camp areas

Suitability: Well suited

Picnic areas

Suitability: Well suited

Playgrounds

Suitability: Well suited

Paths and trails

Suitability: Well suited

Interpretive Group

Land capability classification: IIc

PaC—Palmarejo loam, 5 to 12 percent slopes

Setting

Landscape: Coastal plains

Landform: Alluvial fans

Major uses: Naturalized pastureland

Elevation: Sea level to 165 feet

Composition

Palmarejo and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 9 inches—dark brown loam

Subsoil:

9 to 18 inches—mottled yellowish brown and dark brown clay

18 to 30 inches—yellowish brown clay that has dark yellowish brown mottles

30 to 41 inches—mottled yellowish brown and white clay loam

Substratum:

41 to 60 inches—mottled red and white sandy clay loam that has black manganese concretions

Minor Components

Dissimilar:

- Fraternidad soils, which have a very high shrink-swell potential and are in the lower positions
- Mariana soils, which are moderately deep to saprolite and are in the higher positions

Soil Properties and Qualities

Depth class: Very deep

Parent material: Sediments that weathered from volcanic bedrock

Surface runoff: Medium

Drainage class: Moderately well drained

Permeability: Moderate

Available water capacity: High

Seasonal high water table: None within a depth of 6 feet

Flooding: None

Hazard of water erosion: Moderate

Shrink-swell potential: Low

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Extremely acid or very strongly acid throughout

Land Use

Dominant uses: Naturalized pastureland

Other uses: Pasture; cropland

Agricultural Development

Cropland

Suitability: Moderately suited

Commonly grown crops: Sugar cane; cash crops; pineapples; mangoes; papaya; avocados; pigeonpeas; corn

Management concerns: Tilth; slope

Management measures and considerations:

- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and compaction.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Returning crop residue to the soil improves tilth and the retention of soil moisture and increases the content of organic matter and the supply of plant nutrients.
- A good cropping system and other management practices are needed to control erosion and thereby maintain the supply of plant nutrients, the content of organic matter, and the available water capacity.
- The soil should not be plowed so deeply that heavy clay from the subsoil is mixed with the surface layer.

Pasture and hayland

Suitability: Moderately suited

Commonly grown crops: African star grass; buffelgrass; hurricanegrass; Kleberg's bluestem; guineagrass; elephant grass; sorghum

Management concerns: Tilth; slope

Management measures and considerations:

- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.
- Good pasture management that includes controlled and deferred grazing is needed to prevent overgrazing, and reseeding is needed occasionally to minimize erosion.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Well suited

Management concerns: Tilth; slope

Management measures and considerations:

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.
- Good pasture management that includes controlled and deferred grazing is needed to prevent overgrazing, and reseeding is needed occasionally to minimize erosion.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity during the establishment, maintenance, or renovation of pasture.

Urban Development

Dwellings

Suitability: Moderately suited

Management concerns: Shrink-swell potential; slope

Management measures and considerations:

- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Moderately suited

Management concerns: Moderate permeability; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; shrink-swell potential

Management measures and considerations:

- Identify and removing the low strength layer and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Removing as much of the layer that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.

Recreational Development

Camp areas

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Using the less sloping areas helps to overcome the slope limitation.

Picnic areas

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Using the less sloping areas helps to overcome the slope limitation.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Using the less sloping areas helps to overcome the slope limitation.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Paths and trails

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Interpretive Group

Land capability classification: IIIc

PgA—Parguera clay, 0 to 2 percent slopes

Setting

Landscape: Uplands

Landform: Alluvial fans and terraces

Major uses: Hayland

Elevation: 15 to 50 feet

Composition

Parguera and similar soils: 80 percent

Dissimilar soils: 20 percent

Typical Profile

Surface layer:

0 to 7 inches—dark brown clay

Subsoil:

7 to 22 inches—dark yellowish brown clay

22 to 39 inches—dark yellowish brown extremely gravelly clay that has common filaments of calcium carbonate

39 to 57 inches—dark yellowish brown extremely gravelly coarse sandy loam that has pink, soft masses and filaments of calcium carbonate

Substratum:

57 to 80 inches—strong brown clay that has pink, soft masses of calcium carbonate

Minor Components

Dissimilar:

- Melones soils, which shrink and swell and are in the lower positions

Similar:

- Guayacán soils, which have a finer textured profile than the Parguera soil and are in the higher positions

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Clayey and loamy alluvial sediments that weathered from limestone bedrock

Surface runoff: Low

Drainage class: Well drained

Permeability: Slow

Available water capacity: Very low

Seasonal high water table: None within a depth of 80 inches

Flooding: None

Hazard of water erosion: Slight to moderate

Rock fragments in the surface layer: Less than 5 percent, by volume, pebbles

Shrink-swell potential: Low

Natural fertility: High

Content of organic matter in the surface layer: Moderate to high

Reaction: Slightly alkaline or moderately alkaline throughout

Land Use

Dominant uses: Hayland

Other uses: Pasture

Agricultural Development

Cropland

Suitability: Moderately suited

Commonly grown crops: Cash crops

Management concerns: Very low available water capacity

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.

Pasture and hayland

Suitability: Well suited

Commonly grown crops: Hurricanegrass; Kleberg's bluestem

Management concerns: Weed competition

Management measures and considerations:

- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.
- Using perennial grasses and legumes in rotation helps to penetrate and breakup the clayey root zone.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Well suited

Commonly grown crops: Hurricanegrass; Kleberg's bluestem

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Suited

Management concerns: Slow permeability

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Moderately suited

Management concerns: Low strength

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Well suited

Picnic areas

Suitability: Well suited

Playgrounds

Suitability: Well suited

Paths and trails

Suitability: Well suited

Interpretive Group

Land capability classification: IIc

PgB—Parguera clay, 2 to 5 percent slopes

Setting

Landscape: Uplands

Landform: Alluvial fans

Major uses: Hayland

Elevation: 15 to 50 feet

Composition

Parguera and similar soils: 80 percent

Dissimilar soils: 20 percent

Typical Profile

Surface layer:

0 to 7 inches—dark brown clay

Subsoil:

7 to 22 inches—dark yellowish brown clay

22 to 39 inches—dark yellowish brown extremely gravelly clay that has filaments of calcium carbonate

39 to 57 inches—dark yellowish brown extremely gravelly coarse sandy loam that has pink, soft masses and filaments of calcium carbonate

Substratum:

57 to 80 inches—strong brown clay that has pink, soft masses of calcium carbonate

Minor Components

Dissimilar:

- Melones soils, which shrink and swell and are in the lower positions

Similar:

- Guayacán soils, which have a finer textured profile than the Parguera soil and are in the higher positions
- Steeper Parguera soils

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Clayey and loamy alluvial sediments that weathered from limestone bedrock

Surface runoff: Medium

Drainage class: Well drained

Permeability: Slow

Available water capacity: Very low

Seasonal high water table: None within a depth of 80 inches

Flooding: None

Hazard of water erosion: Moderate

Rock fragments in the surface layer: Less than 5 percent, by volume, pebbles

Shrink-swell potential: Low

Natural fertility: High

Content of organic matter in the surface layer: Moderate to high

Reaction: Slightly alkaline or moderately alkaline throughout

Land Use

Dominant uses: Hayland

Other uses: Pasture

Agricultural Development

Cropland

Suitability: Moderately suited

Commonly grown crops: Cash crops

Management concerns: Very low available water capacity; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.

Pasture and hayland

Suitability: Well suited

Commonly grown crops: Hurricanegrass; Kleberg's bluestem

Management concerns: Weed competition

Management measures and considerations:

- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.
- Using perennial grasses and legumes in rotation helps to penetrate and breakup the clayey root zone.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Well suited

Commonly grown crops: Hurricanegrass; Kleberg's bluestem

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Moderately suited

Management concerns: Slow permeability

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Moderately suited

Management concerns: Low strength

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Well suited

Picnic areas

Suitability: Well suited

Playgrounds

Suitability: Well suited

Paths and trails

Suitability: Well suited

Interpretive Group

Land capability classification: IIc

**PsF—Pitahaya-Limestone outcrop-Seboruco complex,
40 to 60 percent slopes**

Setting

Landscape: Hills

Landform: Hillslopes

Major uses: Wildlife habitat

Elevation: 80 to 575 feet

Composition

Pitahaya and similar soils: 60 percent

Limestone outcrop: 20 percent

Seboruco and similar soils: 15 percent

Dissimilar soils: 5 percent

Typical Profiles

Pitahaya

Surface layer:

0 to 2 inches—dark brown gravelly clay

Subsurface layer:

2 to 11 inches—brown extremely gravelly clay

Bedrock:

11 to 27 inches—very pale brown, hard, semiconsolidated, fractured limestone

27 to 80 inches—very pale brown, hard, consolidated limestone bedrock

Limestone outcrop

Bedrock:

0 to 80 inches—hard, consolidated limestone bedrock from the Tertiary period

Seboruco

Surface layer:

0 to 2 inches—dusky red silty clay loam

Subsoil:

2 to 7 inches—dark reddish brown silty clay loam

7 to 11 inches—dark red gravelly silty clay

11 to 26 inches—reddish yellow gravelly silt loam that has pink, soft masses of calcium carbonate

Substratum:

26 to 31 inches—red loam that has pink, soft masses of calcium carbonate

Bedrock:

31 inches—hard, consolidated limestone bedrock

Minor Components

Dissimilar:

- La Covana soils that are in positions similar to those of the major soils but are shallow to an indurated petrocalcic layer

Soil Properties and Qualities

Depth class: Pitahaya—shallow; Seboruco—moderately deep

Depth to bedrock: Pitahaya—5 to 20 inches; Seboruco—20 to 40 inches

Parent material: Pitahaya—residuum and colluvium that weathered from limestone bedrock; Seboruco—shallow marine sediments overlying limestone bedrock

Surface runoff: Very high

Drainage class: Well drained

Permeability: Pitahaya—very slow; Seboruco—slow

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: Pitahaya—5 to 60 percent, by volume, mostly pebbles and cobbles; Seboruco—less than 10 percent, by volume, mostly pebbles and cobbles

Extent of rock outcrop: 20 percent

Shrink-swell potential: Low

Natural fertility: Pitahaya—low; Seboruco—moderate

Content of organic matter in the surface layer: Pitahaya—moderate to high; Seboruco—moderate

Reaction: Pitahaya—moderately alkaline throughout; Seboruco—slightly alkaline or moderately alkaline in the surface layer and moderately alkaline in the subsoil and substratum

Land Use

Dominant uses: Wildlife habitat

Other uses: Forestland

Agricultural Development

Cropland

Suitability: Pitahaya—unsuited; Seboruco—poorly suited

Management concerns: Pitahaya—depth to bedrock, slope; Seboruco—slope, very low available water capacity

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland

Commonly grown crops: Buffelgrass; guineagrass

Management concerns: Pitahaya—depth to bedrock; slope; Seboruco—slope

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Pitahaya—depth to bedrock, slope; Seboruco—slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Pitahaya—depth to bedrock, slope; Seboruco—slope

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to bedrock.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Pitahaya—depth to bedrock, slope; Seboruco—slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Pitahaya—depth to bedrock, slope; Seboruco—slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Pitahaya—depth to bedrock, slope, small stones; Seboruco—slope

Management measures and considerations:

- Cutting and filling, designing structures to conform to the contour of the natural slope, or using the less sloping areas helps to overcome the slope limitation.
- A properly designed, alternate onsite sewage system can help to overcome the restricted depth to rock.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Pitahaya—depth to bedrock, slope, small stones; Seboruco—slope

Management measures and considerations:

- Establishing a suitable bed of topsoil helps to overcome the restricted depth to bedrock.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Pitahaya—depth to bedrock, slope, small stones; Seboruco—slope

Management measures and considerations:

- Establishing a suitable bed of topsoil helps to overcome the restricted depth to bedrock.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope; small stones

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: Pitahaya—VII; Limestone outcrop—VIII; Seboruco—VIIe

**PsG—Pitahaya-Limestone outcrop-Seboruco complex,
60 to 90 percent slopes**

Setting

Landscape: Hills

Landform: Hillslopes

Major uses: Wildlife habitat

Elevation: 80 to 575 feet

Composition

Pitahaya and similar soils: 60 percent

Limestone outcrop: 20 percent

Seboruco and similar soils: 15 percent

Dissimilar soils: 5 percent

Typical Profiles

Pitahaya

Surface layer:

0 to 2 inches—dark brown gravelly clay

Subsurface layer:

2 to 11 inches—brown extremely gravelly clay

Bedrock:

11 to 27 inches—very pale brown, hard, semiconsolidated, fractured limestone

27 to 80 inches—very pale brown, hard, consolidated limestone bedrock

Limestone outcrop

Bedrock:

0 to 80 inches—hard, consolidated limestone bedrock from the Tertiary period

Seboruco

Surface layer:

0 to 2 inches—dusky red silty clay loam

Subsoil:

2 to 7 inches—dark reddish brown silty clay loam

7 to 11 inches—dark red gravelly silty clay

11 to 26 inches—reddish yellow gravelly silt loam that has pink, soft masses of calcium carbonate

Substratum:

26 to 31 inches—red loam that has pink, soft masses of calcium carbonate

Bedrock:

31 inches—hard, consolidated limestone bedrock

Minor Components

Dissimilar:

- La Covana soils that are in positions similar to those of the major soils but are shallow to an indurated petrocalcic layer

Soil Properties and Qualities

Depth class: Pitahaya—shallow; Seboruco—moderately deep

Depth to bedrock: Pitahaya—5 to 20 inches; Seboruco—20 to 40 inches

Parent material: Pitahaya—residuum and colluvium that weathered from limestone bedrock; Seboruco—shallow marine sediments overlying limestone bedrock

Surface runoff: Very high

Drainage class: Well drained

Permeability: Pitahaya—very slow; Seboruco—slow

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Very severe

Rock fragments in the surface layer: Pitahaya—5 to 60 percent, by volume, mostly pebbles and cobbles; Seboruco—less than 10 percent, by volume, mostly pebbles and cobbles

Extent of rock outcrop: 20 percent

Shrink-swell potential: Low

Natural fertility: Pitahaya—low; Seboruco—moderate

Content of organic matter in the surface layer: Pitahaya—moderate to high; Seboruco—moderate

Reaction: Pitahaya—moderately alkaline throughout; Seboruco—slightly alkaline or moderately alkaline in the subsoil and substratum

Land Use

Dominant uses: Wildlife habitat

Other uses: Forestland

Agricultural Development

Cropland

Suitability: Pitahaya—unsuited; Seboruco—poorly suited

Management concerns: Pitahaya—depth to bedrock, slope; Seboruco—slope, very low available water capacity

Pasture and hayland

Suitability: Unsited

Management concerns: Pitahaya—depth to bedrock, slope; Seboruco—slope

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Unsited

Management concerns: Pitahaya—depth to bedrock, slope; Seboruco—slope

Urban Development

Dwellings

Suitability: Unsited

Management concerns: Pitahaya—depth to bedrock, slope; Seboruco—slope

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to bedrock.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Unsited

Management concerns: Pitahaya—depth to bedrock, slope; Seboruco—slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Pitahaya—depth to bedrock, slope; Seboruco—slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Unsited

Management concerns: Pitahaya—depth to bedrock, slope, small stones; Seboruco—slope

Picnic areas

Suitability: Unsited

Management concerns: Pitahaya—depth to bedrock, slope, small stones; Seboruco—slope

Playgrounds

Suitability: Unsited

Management concerns: Pitahaya—depth to bedrock, slope, small stones; Seboruco—slope

Paths and trails

Suitability: Poorly suited

Management concerns: Slope; small stones

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: Pitahaya—VIIe; Limestone outcrop—VIII; Seboruco—VIIe

Pt—Pits and Quarries

Setting

Landscape: Hills and mountains

Landform: Hillslopes and mountain slopes

Composition

This map unit is a miscellaneous land type consisting of pits and quarries and areas of soils that have been highly disturbed by mechanical means. It commonly includes areas of rock outcrop. Areas of this map unit are mined for clay minerals and stone. These areas have had soil overburden removed and piled to the side. Most areas are idle.

Soil Properties and Qualities

Because of the diversity of this map unit, onsite investigation is needed.

Minor Components

Some areas contain minor inclusions of the original soil material.

Land Use

Dominant uses: Mining

Other uses: Idle land

Agricultural Development

Cropland

- This map unit is severely limited as cropland. A site that has better suited soils should be selected.

Pasture and hayland

- This map unit is severely limited as pasture and hayland. A site that has better suited soils should be selected.

Naturalized pastureland

- This map unit is severely limited as naturalized pastureland. A site that has better suited soils should be selected.

Urban Development

Dwellings

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as sites for dwellings.
- Onsite investigation is needed prior to construction.

Septic tank absorption fields

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as sites for septic tank absorption fields.
- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Onsite investigation is needed prior to construction.
- Because of the extensive disturbance, most areas of this unit are unsuitable as sites for local roads and streets.
- Vegetating disturbed areas and using erosion-control structures, such as sediment fences and sediment catch basins, help to keep soil on the site. These practices should be used during any development.

Recreational Development

Camp areas

Suitability: Unsited

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as camp areas.

Picnic areas

Suitability: Unsited

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as picnic areas.

Playgrounds

Suitability: Unsited

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as sites for playgrounds.

Paths and trails

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as sites for paths and trails.

Interpretive Group

Land capability classification: VIII

PzB—Pozo Blanco clay, 0 to 5 percent slopes

Setting

Landscape: Uplands

Landform: Alluvial fans

Major uses: Pasture

Elevation: 15 to 50 feet

Composition

Pozo Blanco and similar soils: 95 percent
Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 7 inches—very dark grayish brown clay

Subsoil:

7 to 15 inches—very dark grayish brown clay that has soft masses of calcium carbonate

15 to 22 inches—dark brown clay that has soft masses of calcium carbonate

22 to 30 inches—brown gravelly clay loam that has very pale brown, soft masses of calcium carbonate

Substratum:

30 to 40 inches—dark yellowish brown gravelly loam that has very pale brown concretions of calcium carbonate

40 to 60 inches—yellowish brown loam that has very pale brown concretions of calcium carbonate

Minor Components

Similar:

- Aguilita soils, which have a coarser textured profile than the Pozo Blanco soil

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Alluvium and colluvium over residuum that was derived from soft limestone

Surface runoff: Low or medium

Drainage class: Well drained

Permeability: Moderately slow

Available water capacity: Low

Seasonal high water table: None within a depth of 80 inches

Flooding: None

Hazard of water erosion: Slight to moderate

Rock fragments in the surface layer: Less than 20 percent, by volume, pebbles

Shrink-swell potential: Low

Natural fertility: Moderate

Content of organic matter in the surface layer: High or very high

Reaction: Slightly alkaline or moderately alkaline throughout

Land Use

Dominant uses: Pasture

Other uses: Hayland; cropland

Agricultural Development

Cropland

Suitability: Suited

Commonly grown crops: Cash crops

Management concerns: Low available water capacity

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces

the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.

- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients and the content of organic matter.

Pasture and hayland

Suitability: Well suited

Commonly grown crops: Hurricanegrass; Kleberg's bluestem; Bermudagrass; buffelgrass; Mexican bluegrass; Anglenton grass; guineagrass

Management concerns: Weed competition

Management measures and considerations:

- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Well suited

Commonly grown crops: Hurricanegrass; Kleberg's bluestem

Management concerns: Very low available water capacity; weed competition

Management measures and considerations:

- Mechanical and chemical means can be used to help control competition from weeds.

Urban Development

Dwellings

Suitability: Suited

Management concerns: Large stones

Management measures and considerations:

- Removing the large stones and increasing the thickness of the base aggregate improve soil performance.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Large stones; moderately slow permeability

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Large stones; low strength

Management measures and considerations:

- Identify and removing the low strength layer and the large stones and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Large stones; moderately slow permeability; too clayey

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Picnic areas

Suitability: Poorly suited

Management concerns: Large stones; moderately slow permeability; too clayey

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Using the less sloping areas helps to overcome the slope limitation.

Paths and trails

Suitability: Moderately suited

Management concerns: Large stones; too clayey

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Interpretive Group

Land capability classification: IIc

PzC—Pozo Blanco clay, 5 to 12 percent slopes

Setting

Landscape: Uplands

Landform: Alluvial fans and low hills

Major uses: Pasture

Elevation: 15 to 50 feet

Composition

Pozo Blanco and similar soils: 95 percent

Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 7 inches—very dark grayish brown clay

Subsoil:

7 to 15 inches—very dark grayish brown clay that has soft masses of calcium carbonate

15 to 22 inches—dark brown clay that has soft masses of calcium carbonate

22 to 30 inches—brown gravelly clay loam that has very pale brown, soft masses of calcium carbonate

Substratum:

30 to 40 inches—dark yellowish brown gravelly loam that has very pale brown concretions of calcium carbonate

40 to 60 inches—yellowish brown loam that has very pale brown concretions of calcium carbonate

Minor Components

Similar:

- Aguilita soils, which have a coarser textured profile than the Pozo Blanco soil

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Alluvium and colluvium over residuum that was derived from soft limestone

Surface runoff: Medium

Drainage class: Well drained

Permeability: Moderately slow

Available water capacity: Low

Seasonal high water table: None within a depth of 80 inches

Flooding: None

Hazard of water erosion: Moderate to severe

Rock fragments in the surface layer: Less than 20 percent, by volume, pebbles

Shrink-swell potential: Low

Natural fertility: Moderate

Content of organic matter in the surface layer: High or very high

Reaction: Slightly alkaline or moderately alkaline throughout

Land Use

Dominant uses: Pasture

Other uses: Hayland; cropland

Agricultural Development

Cropland

Suitability: Moderately suited or poorly suited

Commonly grown crops: Cash crops

Management concerns: Low available water capacity; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients and the content of organic matter.

Pasture and hayland

Suitability: Moderately suited

Commonly grown crops: Hurricanegrass; Kleberg's bluestem; Bermudagrass; buffelgrass; Mexican bluegrass; Anglenton grass; guineagrass

Management concerns: Weed competition

Management measures and considerations:

- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.
- Mechanical and chemical means can be used to help control competition from weeds.
- Good pasture management that includes controlled and deferred grazing is needed to prevent overgrazing, and reseeding is needed occasionally to minimize erosion.

Naturalized pastureland

Suitability: Well suited

Commonly grown crops: Hurricanegrass; Kleberg's bluestem

Management concerns: Weed competition

Management measures and considerations:

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.
- Good pasture management that includes controlled and deferred grazing is needed to prevent overgrazing, and reseeded is needed occasionally to minimize erosion.
- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Mechanical and chemical means can be used to help control competition from weeds.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity during the establishment, maintenance, or renovation of pasture.

Urban Development

Dwellings

Suitability: Suited

Management concerns: Large stones; slope

Management measures and considerations:

- Removing the large stones and increasing the thickness of the base aggregate improve soil performance.
- Cutting and filling, designing structures to conform to the contour of the natural slope, or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Large stones; moderately slow permeability; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Large stones; low strength; slope

Management measures and considerations:

- Identify and removing the low strength layer and the large stones and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Large stones; slope; slow permeability; too clayey

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Using the less sloping areas helps to overcome the slope limitation.

Picnic areas

Suitability: Poorly suited

Management concerns: Large stones; slope; slow permeability; too clayey

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Using the less sloping areas helps to overcome the slope limitation.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Cutting and filling or using the less sloping areas helps to overcome the slope limitation.

Paths and trails

Suitability: Moderately suited

Management concerns: Large stones; too clayey

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Interpretive Group

Land capability classification: IIIc

PzD—Pozo Blanco clay, 12 to 20 percent slopes

Setting

Landscape: Uplands

Landform: Alluvial fans and low hills

Major uses: Pasture

Elevation: 15 to 50 feet

Composition

Pozo Blanco and similar soils: 95 percent

Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 7 inches—very dark grayish brown clay

Subsoil:

7 to 15 inches—very dark grayish brown clay that has soft masses of calcium carbonate

15 to 22 inches—dark brown clay that has soft masses of calcium carbonate

22 to 30 inches—brown gravelly clay loam that has very pale brown, soft masses of calcium carbonate

Substratum:

30 to 40 inches—dark yellowish brown gravelly loam that has very pale brown concretions of calcium carbonate

40 to 60 inches—yellowish brown loam that has very pale brown concretions of calcium carbonate

Minor Components

Dissimilar:

- Duey and San Germán soils, which are shallow to limestone bedrock

Similar:

- Aguilita soils, which have a coarser textured profile than the Pozo Blanco soil

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Alluvium and colluvium over residuum that was derived from soft limestone

Surface runoff: High

Drainage class: Well drained

Permeability: Moderately slow

Available water capacity: Low

Seasonal high water table: None within a depth of 80 inches

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: Less than 20 percent, by volume, pebbles

Shrink-swell potential: Low

Natural fertility: Moderate

Content of organic matter in the surface layer: High or very high

Reaction: Slightly alkaline or moderately alkaline throughout

Land Use

Dominant uses: Pasture

Other uses: Naturalized pastureland; cropland

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Cash crops

Management concerns: Low available water capacity; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients and the content of organic matter.

Pasture and hayland

Suitability: Suited to pasture; poorly suited to hayland

Commonly grown crops: Hurricanegrass; Kleberg's bluestem; Bermudagrass; buffelgrass; Mexican bluegrass; Anglenton grass; guineagrass

Management concerns: Weed competition; slope

Management measures and considerations:

- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

- Mechanical and chemical means can be used to help control competition from weeds.
- Good pasture management that includes controlled and deferred grazing is needed to prevent overgrazing, and reseeding is needed occasionally to minimize erosion.
- Preparing seedbeds on the contour or across the slope helps to control erosion and increases the rate of germination.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Moderately suited

Commonly grown crops: Hurricanegrass; Kleberg's bluestem

Management concerns: Slope; weed competition

Management measures and considerations:

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.
- Good pasture management that includes controlled and deferred grazing is needed to prevent overgrazing, and reseeding is needed occasionally to minimize erosion.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Mechanical and chemical means can be used to help control competition from weeds.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Large stones; slope

Management measures and considerations:

- Removing the large stones and increasing the thickness of the base aggregate improve soil performance.
- Cutting and filling, designing structures to conform to the contour of the natural slope, or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Large stones; restricted permeability; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; slope

Management measures and considerations:

- Identify and removing the low strength layer and the large stones and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Large stones; slope; slow permeability; too clayey

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Using the less sloping areas helps to overcome the slope limitation.

Picnic areas

Suitability: Poorly suited

Management concerns: Large stones; slow permeability; slope; too clayey

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Using the less sloping areas helps to overcome the slope limitation.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Cutting and filling or using the less sloping areas helps to overcome the slope limitation.

Paths and trails

Suitability: Moderately suited

Management concerns: Large stones; slope; too clayey

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.
- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: IIIc

QbD—Quebrada clay loam, 12 to 20 percent slopes

Setting

Landscape: Mountains

Landform: Mountain slopes

Major uses: Cropland

Elevation: 490 to 1,970 feet

Composition

Quebrada and similar soils: 95 percent

Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 2 inches—very dark gray clay loam

Subsoil:

2 to 10 inches—brown clay

10 to 19 inches—dark grayish brown clay

Bedrock:

19 to 26 inches—highly weathered volcanic rock

26 to 60 inches—highly fractured volcanic rock

Minor Components

Dissimilar:

- El Cacique and La Taína soils that are in positions similar to those of the Quebrada soil but are shallow to serpentine bedrock
- Múcara soils that are in positions similar to those of the Quebrada soil but are moderately deep to bedrock

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: 9 to 20 inches

Parent material: Colluvium and residuum weathered from tuffaceous sandstone, siltstone, breccia, conglomerate, lava, and tuff

Surface runoff: Medium

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Moderate

Flooding: None

Hazard of water erosion: Moderate

Rock fragments in the surface layer: 2 to 10 percent, by volume, pebbles and cobbles

Extent of rock outcrop: Less than 5 percent

Shrink-swell potential: Low

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderately low or moderate

Reaction: Slightly acid or neutral throughout

Land Use

Dominant uses: Cropland

Other uses: Pasture; naturalized pastureland

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Coffee; pigeonpeas; bananas; plantains

Management concerns: Depth to rock; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Moderately suited to pasture; unsuited to hayland

Commonly grown crops: Guineagrass; pangola grass; African star grass

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The moderately steep slopes increase the difficulty of management.
- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Erodibility; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The moderately steep slopes increase the difficulty of management.
- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Moderately suited or poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Moderately suited or poorly suited

Management concerns: Slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; slope

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Moderately suited or poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: IVe

QbE—Quebrada clay loam, 20 to 40 percent slopes

Setting

Landscape: Mountains

Landform: Mountain slopes

Major uses: Cropland

Elevation: 490 to 1,970 feet

Composition

Quebrada and similar soils: 95 percent

Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 2 inches—very dark gray clay loam

Subsoil:

2 to 10 inches—brown clay

10 to 19 inches—dark grayish brown clay

Bedrock:

19 to 26 inches—highly weathered volcanic rock

26 to 60 inches—highly fractured volcanic rock

Minor Components

Dissimilar:

- El Cacique and La Taína soils that are in positions similar to those of the Quebrada soil but are shallow to serpentine bedrock
- Múcara soils that are in positions similar to those of the Quebrada soil but are moderately deep to bedrock

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: 9 to 20 inches

Parent material: Colluvium and residuum material that weathered from tuffaceous sandstone, siltstone, breccia, conglomerate, lava, and tuff

Surface runoff: High

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Moderate

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: 2 to 10 percent, by volume, pebbles and cobbles

Extent of rock outcrop: Less than 5 percent

Shrink-swell potential: Low

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderately low or moderate

Reaction: Slightly acid or neutral throughout

Land Use

Dominant uses: Cropland

Other uses: Naturalized pastureland; forestland

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Coffee; pigeonpeas; bananas; plantains

Management concerns: Depth to rock; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland

Commonly grown crops: Guineagrass; pangola grass; African star grass

Management concerns: Erosion; slope

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Erosion; slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; slope

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: VIe

QbF—Quebrada clay loam, 40 to 60 percent slopes

Setting

Landscape: Mountains

Landform: Mountain slopes

Major uses: Forestland

Elevation: 490 to 1,970 feet

Composition

Quebrada and similar soils: 95 percent

Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 2 inches—very dark gray clay loam

Subsoil:

2 to 10 inches—brown clay

10 to 19 inches—dark grayish brown clay

Bedrock:

19 to 26 inches—highly weathered volcanic rock

26 to 60 inches—highly fractured volcanic rock

Minor Components

Dissimilar:

- El Cacique and La Taína soils that are in positions similar to those of the Quebrada soil but are shallow to serpentine bedrock
- Múcara soils that are in positions similar to those of the Quebrada soil but are moderately deep to bedrock

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: 9 to 20 inches

Parent material: Colluvium and residuum material that weathered from tuffaceous sandstone, siltstone, breccia, conglomerate, lava, and tuff

Surface runoff: High

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Moderate

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: 2 to 10 percent, by volume, pebbles and cobbles

Extent of rock outcrop: Less than 5 percent

Shrink-swell potential: Low

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderately low or moderate

Reaction: Slightly acid or neutral throughout

Land Use

Dominant uses: Forestland

Other uses: Naturalized pastureland; cropland

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Coffee; pigeonpeas; bananas; plantains

Management concerns: Depth to rock; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland

Commonly grown crops: Guineagrass; pangola grass; African star grass

Management concerns: Erosion; slope

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Erosion; slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Poorly suited or unsuited

Management concerns: Slope

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited or unsuited

Management concerns: Slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; slope

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Unsuited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Unsuited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Unsuited

Management concerns: Slope

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: VIIe

ReA—Reilly sandy loam, 0 to 2 percent slopes, frequently flooded

Setting

Landscape: River valleys

Landform: Flood plains

Major uses: Pasture

Elevation: 30 to 100 feet

Composition

Reilly and similar soils: 95 percent

Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 4 inches—dark olive brown sandy loam

Substratum:

4 to 8 inches—dark olive brown loamy sand

8 to 11 inches—dark olive brown fine sandy loam that has yellowish brown mottles

11 to 17 inches—dark grayish brown fine sandy loam that has reddish brown mottles

17 to 23 inches—dark olive brown extremely gravelly coarse sand

23 to 32 inches—very dark grayish brown sand

32 to 36 inches—very dark grayish brown loam that has yellowish brown mottles

36 to 80 inches—very dark grayish brown extremely gravelly sand

Minor Components

Dissimilar:

- Dique soils that are in positions similar to those of the Reilly soil but have a finer textured profile

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 75 inches

Parent material: Stratified alluvial deposits of mixed origin

Surface runoff: Negligible

Drainage class: Excessively drained

Permeability: Rapid

Available water capacity: Low

Seasonal high water table: Apparent, at a depth of 2½ to 5 feet from August through October

Flooding: Frequent, very brief duration

Hazard of water erosion: Slight

Rock fragments in the surface layer: Less than 20 percent, by volume, pebbles

Shrink-swell potential: Low

Natural fertility: Low

Content of organic matter in the surface layer: Moderate

Reaction: Neutral to moderately alkaline throughout

Land Use

Dominant uses: Pasture

Other uses: Naturalized pastureland

Agricultural Development

Cropland

Suitability: Poorly suited

Management concerns: Low available water capacity

Pasture and hayland

Suitability: Moderately suited to pasture; poorly suited to hayland

Commonly grown crops: African star grass; merker grass; pangola grass; guineagrass

Management concerns: Low available water capacity

Management measures and considerations:

- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Moderately suited

Commonly grown crops: African star grass; merker grass; pangola grass; guineagrass

Management concerns: Seasonal wetness

Management measures and considerations:

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Unsited

Management concerns: Flooding

Septic tank absorption fields

Suitability: Unsited

Management concerns: Flooding; poor filtering capacity

Local roads and streets

Suitability: Unsited

Management concerns: Flooding

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Flooding

Picnic areas

Suitability: Moderately suited

Management concerns: Seasonal flooding; small stones

Playgrounds

Suitability: Moderately suited

Management concerns: Seasonal flooding; small stones

Paths and trails

Suitability: Moderately suited

Management concerns: Seasonal flooding

Interpretive Group

Land capability classification: IIIw

RoD—Rosario silty clay, 12 to 20 percent slopes

Setting

Landscape: Hills and mountains

Landform: Ridges

Major uses: Urban development and forestland

Elevation: 164 to 2,130 feet

Composition

Rosario and similar soils: 80 percent

Dissimilar soils: 20 percent

Typical Profile

Surface layer:

0 to 2 inches—leaves, needles, twigs, sticks, bark, and decomposed organic material

2 to 6 inches—dark yellowish brown silty clay that has iron-manganese concretions

Subsoil:

6 to 16 inches—dusky red silty clay that has iron-manganese concretions

16 to 32 inches—dusky red silty clay loam that has iron-manganese concretions

Bedrock:

32 to 44 inches—highly fractured, weathered serpentinite bedrock

44 inches—hard, consolidated serpentinite bedrock

Minor Components

Dissimilar:

- Delicias soils, which have a coarser textured profile than the Rosario soil, are deeper, and are in the lower positions
- Nipe soils, which are very deep to serpentinite bedrock and are in the less sloping areas

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: 20 to 45 inches

Parent material: Iron-rich residuum that weathered from serpentinite bedrock

Surface runoff: High

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Moderate

Flooding: None

Hazard of water erosion: Moderate

Rock fragments in the surface layer: Less than 5 percent, by volume

Shrink-swell potential: Low

Natural fertility: Low

Content of organic matter in the surface layer: High

Reaction: Strongly acid to slightly acid in the surface layer and the upper part of the subsoil and slightly acid or neutral in the lower part of the subsoil

Land Use

Dominant uses: Urban development

Other uses: Forestland

Agricultural Development

Cropland

Suitability: Poorly suited

Management concerns: Soil fertility

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Moderately suited to pasture; poorly suited to hayland

Commonly grown crops: Guineagrass; pangola grass; African star grass

Management concerns: Erosion; slope; weed competition

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The moderately steep slopes increase the difficulty of management.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Preparing seedbeds on the contour or across the slope helps to control erosion and increases the rate of germination.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Moderately suited

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The moderately steep slopes increase the difficulty of management.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Moderately suited

Management concerns: Slope; depth to rock

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.
- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; slope

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Too clayey

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: IVs

RoE—Rosario silty clay, 20 to 40 percent slopes

Setting

Landscape: Hills and mountains

Landform: Hillslopes and mountain slopes

Major uses: Urban development and forestland

Elevation: 164 to 2,130 feet

Composition

Rosario and similar soils: 80 percent

Dissimilar soils: 20 percent

Typical Profile

Surface layer:

0 to 2 inches—leaves, needles, twigs, sticks, bark, and decomposed organic material

2 to 6 inches—dark yellowish brown silty clay that has iron-manganese concretions

Subsoil:

6 to 16 inches—dusky red silty clay that has iron-manganese concretions

16 to 32 inches—dusky red silty clay loam that has iron-manganese concretions

Bedrock:

32 to 44 inches—highly fractured, weathered serpentinite bedrock

44 inches—hard, consolidated serpentinite bedrock

Minor Components

Dissimilar:

- Delicias soils, which have a coarser textured profile than the Rosario soil, are deeper, and are in the lower positions
- Nipe soils, which are very deep to serpentinite bedrock and are in the less sloping areas

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: 20 to 45 inches

Parent material: Iron-rich residuum that weathered from serpentinite bedrock

Surface runoff: Very high

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Moderate

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: Less than 5 percent, by volume

Shrink-swell potential: Low

Natural fertility: Low

Content of organic matter in the surface layer: High

Reaction: Strongly acid to slightly acid in the surface layer and the upper part of the subsoil and slightly acid or neutral in the lower part of the subsoil

Land Use

Dominant uses: Urban development

Other uses: Forestland

Agricultural Development

Cropland

Suitability: Poorly suited

Management concerns: Soil fertility

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland

Commonly grown crops: Guineagrass; pangola grass; African star grass

Management concerns: Erosion; slope; weed competition

Management measures and considerations:

- Erosion is a concern in unprotected areas.

- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Preparing seedbeds on the contour or across the slope helps to control erosion and increases the rate of germination.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Slope; slippage

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.
- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by slippage.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope; slippage

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; slope; slippage

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.
- Constructing diversions across the slope improves the stability of side slopes.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Too clayey

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: VIe

RoF—Rosario silty clay, 40 to 60 percent slopes

Setting

Landscape: Hills and mountains

Landform: Hillslopes and mountain slopes

Major uses: Forestland

Elevation: 490 to 2,130 feet

Composition

Rosario and similar soils: 80 percent

Dissimilar soils: 20 percent

Typical Profile

Surface layer:

0 to 2 inches—leaves, needles, twigs, sticks, bark, and decomposed organic material

2 to 6 inches—dark yellowish brown silty clay that has iron-manganese concretions

Subsoil:

6 to 16 inches—dusky red silty clay that has iron-manganese concretions

16 to 32 inches—dusky red silty clay loam that has iron-manganese concretions

Bedrock:

32 to 44 inches—highly fractured, weathered serpentinite bedrock

44 inches—hard, consolidated serpentinite bedrock

Minor Components

Dissimilar:

- El Cacique and La Taína soils that are in positions similar to those of the Rosario soil but are shallow to serpentinite bedrock
- Maresúa soils that are in positions similar to those of the Rosario soil but are moderately deep to serpentinite bedrock and have a mollic epipedon

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: 20 to 45 inches

Parent material: Iron-rich residuum that weathered from serpentinite bedrock

Surface runoff: Very high

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Moderate

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: Less than 5 percent, by volume

Shrink-swell potential: Low

Natural fertility: Low

Content of organic matter in the surface layer: High

Reaction: Strongly acid to slightly acid in the surface layer and the upper part of the subsoil and slightly acid or neutral in the lower part of the subsoil

Land Use

Dominant uses: Forestland

Other uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Soil fertility; slope

Pasture and hayland

Suitability: Poorly suited to pasture; unsited to hayland

Commonly grown crops: Pangola grass

Management concerns: Erosion; slope; weed competition

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Slope; slippage

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.
- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by slippage.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope; slippage

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; slope; slippage

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.
- Constructing diversions across the slope improves the stability of side slopes.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Too clayey

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: Vlle

RuF—Rubias-Chiquito complex, 40 to 60 percent slopes

Setting

Landscape: Mountain ranges

Landform: Ridges and mountain slopes (fig. 13)

Major uses: Cropland and naturalized pastureland

Elevation: 2,460 to 3,609 feet



Figure 13.—Pastureland in an area of Rubias-Chiquito complex, 40 to 60 percent slopes, and Rubias-Chiquito complex, 60 to 90 percent slopes.

Composition

Rubias and similar soils: 50 percent
Chiquito and similar soils: 40 percent
Dissimilar soils: 10 percent

Typical Profiles

Rubias

Surface layer:

0 to 8 inches—very dark grayish brown clay loam

Subsoil:

8 to 18 inches—very dark grayish brown clay loam

Substratum:

18 to 25 inches—brown loam

Bedrock:

25 to 50 inches—moderately weathered, unconsolidated mudstone

50 to 80 inches—hard, fractured consolidated mudstone

Chiquito

Surface layer:

0 to 5 inches—dark grayish brown gravelly clay loam

Subsoil:

5 to 11 inches—brown very gravelly clay loam

11 to 18 inches—very dark grayish brown extremely gravelly clay loam

Bedrock:

18 inches—hard, fractured, consolidated mudstone

Minor Components

Dissimilar:

- Small areas of volcanic rock outcrop

Soil Properties and Qualities

Depth class: Rubias—moderately deep; Chiquito—shallow

Depth to bedrock: Rubias—18 to 50 inches; Chiquito—14 to 19 inches

Parent material: Residuum that weathered from mudstone

Surface runoff: High

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Low or moderate

Flooding: None

Hazard of water erosion: Moderate to severe

Rock fragments in the surface layer: Less than 35 percent, by volume, pebbles

Extent of rock outcrop: 10 percent

Shrink-swell potential: Moderate

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate to high

Reaction: Slightly acid or neutral

Land Use

Dominant uses: Cropland

Other uses: Naturalized pastureland

Agricultural Development

Cropland

Suitability: Rubias—poorly suited; Chiquito—unsuited

Commonly grown crops: Coffee; oranges; bananas; plantains

Management concerns: Erosion; slope; depth to bedrock

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland

Commonly grown crops: African star grass; guineagrass; pangola grass

Management concerns: Erosion; slope; weed competition

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The very steep slopes increase the difficulty of management.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Preparing seedbeds on the contour or across the slope helps to control erosion and increases the rate of germination.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.

- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- The very steep slopes increase the difficulty of management.
- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Rubias—poorly suited; Chiquito—unsuited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Rubias—moderately suited to poorly suited; Chiquito—poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: Vlle

RuG—Rubias-Chiquito complex, 60 to 90 percent slopes

Setting

Landscape: Mountain ranges

Landform: Ridges and mountain slopes

Major uses: Cropland and forestland

Elevation: 2,460 to 3,609 feet

Composition

Rubias and similar soils: 50 percent

Chiquito and similar soils: 40 percent

Dissimilar soils: 10 percent

Typical Profiles

Rubias

Surface layer:

0 to 8 inches—very dark grayish brown clay loam

Subsoil:

8 to 18 inches—very dark grayish brown clay loam

Substratum:

18 to 25 inches—brown loam

Bedrock:

25 to 50 inches—moderately weathered, unconsolidated mudstone

50 to 80 inches—hard, fractured, consolidated mudstone

Chiquito

Surface layer:

0 to 5 inches—dark grayish brown gravelly clay loam

Subsoil:

5 to 11 inches—brown very gravelly clay loam

11 to 18 inches—very dark grayish brown extremely gravelly clay loam

Bedrock:

18 inches—hard, fractured, consolidated mudstone

Minor Components

Dissimilar:

- Small areas of volcanic rock outcrop

Soil Properties and Qualities

Depth class: Rubias—moderately deep; Chiquito—shallow
Depth to bedrock: Rubias—18 to 50 inches; Chiquito—14 to 19 inches
Parent material: Residuum that weathered from mudstone
Surface runoff: High
Drainage class: Well drained
Permeability: Moderate
Available water capacity: Low or moderate
Flooding: None
Hazard of water erosion: Severe
Rock fragments in the surface layer: Less than 35 percent, by volume, pebbles
Extent of rock outcrop: 10 percent
Shrink-swell potential: Moderate
Natural fertility: Moderate
Content of organic matter in the surface layer: Moderate
Reaction: Slightly acid or neutral

Land Use

Dominant uses: Cropland
Other uses: Forestland

Agricultural Development

Cropland

Suitability: Unsited
Commonly grown crops: Coffee; oranges; bananas; plantains
Management concerns: Erosion; slope; depth to bedrock

Pasture and hayland

Suitability: Unsited
Management concerns: Erosion
Management measures and considerations:

- Erosion is a concern in unprotected areas.

Naturalized pastureland

Suitability: Unsited
Management concerns: Erosion
Management measures and considerations:

- Erosion is a concern in unprotected areas.

Urban Development

Dwellings

Suitability: Unsited
Management concerns: Slope

Septic tank absorption fields

Suitability: Unsited
Management concerns: Depth to rock; slope

Local roads and streets

Suitability: Poorly suited
Management concerns: Low strength; slope
Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.
- A properly designed road drainage system that includes carefully located culverts and gutters helps to control erosion.

Recreational Development

Camp areas

Suitability: Unsited

Management concerns: Slope

Picnic areas

Suitability: Unsited

Management concerns: Slope

Playgrounds

Suitability: Unsited

Management concerns: Slope

Paths and trails

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: Vlle

Sa—Salt flats, ponded

Setting

Landscape: Coastal plains

Landform: Tidal flats and tidal marshes

Composition

This map unit is a miscellaneous land type consisting of salt flats. It commonly includes areas of tidal flats and tidal marshes. Areas of this map unit are protected as wildlife habitats. Most areas are idle.

Soil Properties and Qualities

Because of the diversity of this map unit, onsite investigation is needed.

Minor Components

Some areas contain minor inclusions of the original Bahía Salinas soil.

Land Use

Dominant uses: Wildlife habitat

Other uses: Idle land

Agricultural Development

Cropland

- This map unit is severely limited as cropland. A site that has better suited soils should be selected.

Pasture and hayland

- This map unit is severely limited as pasture and hayland. A site that has better suited soils should be selected.

Naturalized pastureland

- This map unit is severely limited as naturalized pastureland. A site that has better suited soils should be selected.

Urban Development

Dwellings

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as sites for dwellings.
- Onsite investigation is needed prior to construction.

Septic tank absorption fields

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as sites for septic tank absorption fields.

Local roads and streets

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as sites for local roads and streets.
- Onsite investigation is needed prior to construction.

Recreational Development

Camp areas

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as camp areas.

Picnic areas

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as picnic areas.

Playgrounds

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as sites for playgrounds.

Paths and trails

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as sites for paths and trails.

Interpretive Group

Land capability classification: VIII

Sb—Salt pits

Setting

Landscape: Coastal plains

Landform: Tidal flats

Composition

This map unit is a miscellaneous land type consisting of areas from which salt has been extracted. It commonly includes areas of tidal flats. Areas of this map unit are mined for salt production. These areas have had soil overburden removed and piled to the side. Most areas are idle.

Soil Properties and Qualities

Because of the diversity of this map unit, onsite investigation is needed.

Minor Components

Some areas contain minor inclusions of the original soil material.

Land Use

Dominant uses: Salt mining

Other uses: Idle land

Agricultural Development

Cropland

- This map unit is severely limited as cropland. A site that has better suited soils should be selected.

Pasture and hayland

- This map unit is severely limited as pasture and hayland. A site that has better suited soils should be selected.

Naturalized pastureland

- This map unit is severely limited as naturalized pastureland. A site that has better suited soils should be selected.

Urban Development

Dwellings

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as sites for dwellings.
- Onsite investigation is needed prior to construction.

Septic tank absorption fields

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as sites for septic tank absorption fields.

Local roads and streets

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as sites for local roads and streets.
- Onsite investigation is needed prior to construction.

Recreational Development

Camp areas

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as camp areas.

Picnic areas

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as picnic areas.

Playgrounds

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as sites for playgrounds.

Paths and trails

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as sites for paths and trails.

Interpretive Group

Land capability classification: VIII

**ScA—San Antón clay loam, 0 to 2 percent slopes,
occasionally flooded**

Setting

Landscape: River valleys

Landform: Flood plains

Major uses: Cropland

Elevation: Sea level to 165 feet

Composition

San Antón and similar soils: 95 percent

Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 13 inches—very dark grayish brown clay loam

Subsoil:

13 to 24 inches—very dark grayish brown and dark brown silty clay loam

24 to 31 inches—very dark grayish brown and dark brown clay loam

31 to 41 inches—very dark grayish brown sandy clay loam

41 to 80 inches—dark brown sandy clay loam

Minor Components

Dissimilar:

- Vayas soils, which are poorly drained and are in the lower positions

Similar:

- Cortada soils that are in positions similar to those of the San Antón soil but have masses of calcium carbonate in the subsoil

Soil Properties and Qualities

Depth class: Very deep

Parent material: Stratified alluvial deposits of mixed origin

Surface runoff: Negligible

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Very low or low

Seasonal high water table: None within a depth of 6 feet

Flooding: Occasional, brief duration

Hazard of water erosion: Slight

Shrink-swell potential: Moderate in the surface layer; low in the subsoil

Natural fertility: High

Content of organic matter in the surface layer: High

Reaction: Slightly alkaline or moderately alkaline throughout

Land Use

Dominant uses: Cropland

Other uses: Naturalized pastureland

Agricultural Development

Cropland

Suitability: Well suited

Commonly grown crops: Bananas; plantains; cash crops

Management concerns: Seasonal wetness

Management measures and considerations:

- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.

Pasture and hayland

Suitability: Well suited

Commonly grown crops: Kleberg's bluestem; hurricanegrass

Management concerns: Seasonal wetness

Management measures and considerations:

- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Well suited

Management concerns: Seasonal wetness

Management measures and considerations:

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Unsited

Management concerns: Flooding

Septic tank absorption fields

Suitability: Unsited

Management concerns: Flooding

Local roads and streets

Suitability: Unsited

Management concerns: Low strength; seasonal wetness

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Unsited

Management concerns: Flooding

Picnic areas

Suitability: Moderately suited

Management concerns: Flooding

Playgrounds

Suitability: Moderately suited

Management concerns: Flooding

Paths and trails

Suitability: Moderately suited

Management concerns: Flooding

Interpretive Group

Land capability classification: IIc

SdD—San Germán cobbly clay loam, 5 to 20 percent slopes

Setting

Landscape: Hills

Landform: Hillslopes

Major uses: Naturalized pastureland

Elevation: 80 to 900 feet

Composition

San Germán and similar soils: 100 percent

Typical Profile

Surface layer:

0 to 4 inches—very dark grayish brown cobbly clay loam

4 to 10 inches—very dark grayish brown extremely gravelly clay loam

Bedrock:

10 to 80 inches—hard, consolidated limestone bedrock

Minor Components

Similar:

- Duey soils that are in positions similar to those of the San Germán soil but have highly fractured limestone overlying the unweathered bedrock

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: 10 to 20 inches

Parent material: Material that weathered from limestone bedrock from the Cretaceous period

Surface runoff: High

Drainage class: Well drained

Permeability: Very slow

Available water capacity: Very low

Hazard of water erosion: Severe

Flooding: None

Rock fragments in the surface layer: 10 to 60 percent, by volume, mostly pebbles and cobbles

Extent of rock outcrop: Less than 5 percent

Shrink-swell potential: Low

Natural fertility: Low

Content of organic matter in the surface layer: Moderate

Reaction: Slightly alkaline or moderately alkaline

Land Use

Dominant uses: Naturalized pastureland

Other uses: Urban development

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Very low available water capacity; depth to rock; slope

Pasture and hayland

Suitability: Poorly suited to pasture; unsited to hayland

Commonly grown crops: Buffelgrass; guineagrass; pangola grass

Management concerns: Very low available water capacity; depth to rock; slope

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Very low available water capacity; depth to rock; slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope; large stones

Management measures and considerations:

- Cutting and filling, designing structures to conform to the contour of the natural slope, or using the less sloping areas helps to overcome the slope limitation.
- A properly designed, alternate onsite sewage system can help to overcome the restricted depth to rock.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope; large stones

Management measures and considerations:

- Establishing a suitable bed of topsoil helps to overcome the restricted depth to rock.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Depth to rock; slope; large stones

Management measures and considerations:

- Establishing a suitable bed of topsoil helps to overcome the restricted depth to rock.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope; large stones

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: VIs

SdF—San Germán cobbly clay loam, 20 to 60 percent slopes

Setting

Landscape: Hills
Landform: Hillslopes
Major uses: Wildlife habitat
Elevation: 80 to 900 feet

Composition

San Germán and similar soils: 100 percent

Typical Profile

Surface layer:
0 to 4 inches—very dark grayish brown cobbly clay loam
4 to 10 inches—very dark grayish brown extremely gravelly clay loam

Bedrock:
10 to 80 inches—hard, consolidated limestone bedrock

Minor Components

Similar:

- Duey soils that are in positions similar to those of the San Germán soil but have highly fractured limestone overlying the unweathered bedrock

Soil Properties and Qualities

Depth class: Shallow
Depth to bedrock: 10 to 20 inches
Parent material: Material that weathered from limestone bedrock from the Cretaceous period
Surface runoff: Very high
Drainage class: Well drained
Permeability: Very slow
Available water capacity: Very low
Flooding: None
Hazard of water erosion: Severe
Rock fragments in the surface layer: 10 to 60 percent, by volume, mostly pebbles and cobbles
Extent of rock outcrop: Less than 5 percent
Shrink-swell potential: Low
Natural fertility: Low
Content of organic matter in the surface layer: Moderate
Reaction: Slightly alkaline or moderately alkaline

Land Use

Dominant uses: Wildlife habitat
Other uses: Naturalized pastureland

Agricultural Development

Cropland

Suitability: Unsited
Management concerns: Very low available water capacity; depth to rock; slope

Pasture and hayland

Suitability: Unsited
Commonly grown crops: Buffelgrass; guineagrass; pangola grass
Management concerns: Very low available water capacity; depth to rock; slope

Naturalized pastureland

Suitability: Unsited

Management concerns: Very low available water capacity; depth to rock; slope

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited or unsited

Management concerns: Depth to rock; slope; large stones

Management measures and considerations:

- Cutting and filling, designing structures to conform to the contour of the natural slope, or using the less sloping areas helps to overcome the slope limitation.
- A properly designed, alternate onsite sewage system can help to overcome the restricted depth to rock.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Unsited

Management concerns: Depth to rock; slope; large stones

Management measures and considerations:

- Establishing a suitable bed of topsoil helps to overcome the restricted depth to rock.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Unsited

Management concerns: Depth to rock; slope; large stones

Management measures and considerations:

- Establishing a suitable bed of topsoil helps to overcome the restricted depth to rock.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope; large stones

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: VIIIs

SgD—San Germán-Duey complex, 5 to 20 percent slopes

Setting

Landscape: Hills

Landform: Hillslopes

Major uses: Naturalized pastureland

Elevation: 80 to 900 feet

Composition

San Germán and similar soils: 60 percent

Duey and similar soils: 40 percent

Typical Profiles

San Germán

Surface layer:

0 to 4 inches—very dark grayish brown cobbly clay loam

4 to 10 inches—very dark grayish brown extremely gravelly clay loam

Bedrock:

10 to 80 inches—hard, consolidated limestone bedrock

Duey

Surface layer:

0 to 8 inches—very dark grayish brown gravelly clay loam

8 to 13 inches—brown very gravelly clay loam

Substratum:

13 to 17 inches—yellowish brown extremely gravelly clay loam

Bedrock:

17 to 35 inches—highly fractured limestone

35 inches—hard, consolidated limestone bedrock

Minor Components

Dissimilar:

- Scattered areas of limestone rock outcrop

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: San Germán—10 to 20 inches; Duey—10 to 20 inches to highly fractured limestone and 30 to 55 inches to unweathered limestone bedrock

Parent material: Material that weathered from limestone bedrock from the Cretaceous period

Surface runoff: San Germán—high; Duey—very high

Drainage class: Well drained

Permeability: Very slow

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: San Germán—10 to 60 percent, by volume, mostly pebbles and cobbles; Duey—10 to 60 percent, by volume, mostly pebbles

Extent of rock outcrop: Less than 5 percent

Shrink-swell potential: Low

Natural fertility: Low

Content of organic matter in the surface layer: Moderate

Reaction: San Germán—slightly alkaline or moderately alkaline throughout; Duey—neutral to moderately alkaline throughout

Land Use

Dominant uses: Naturalized pastureland

Other uses: Urban development

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Very low available water capacity; depth to rock; slope

Pasture and hayland

Suitability: Poorly suited to pasture; unsited to hayland

Commonly grown crops: Buffelgrass; guineagrass; pangola grass

Management concerns: Very low available water capacity; depth to rock; slope

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Very low available water capacity; depth to rock; slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope; large stones

Management measures and considerations:

- Cutting and filling, designing structures to conform to the contour of the natural slope, or using the less sloping areas helps to overcome the slope limitation.
- A properly designed, alternate onsite sewage system can help to overcome the restricted depth to rock.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope; large stones

Management measures and considerations:

- Establishing a suitable bed of topsoil helps to overcome the restricted depth to rock.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Depth to rock; slope; large stones

Management measures and considerations:

- Establishing a suitable bed of topsoil helps to overcome the restricted depth to rock.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope; large stones

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: San Germán—VIs; Duey—VIs

SgF—San Germán-Duey complex, 20 to 60 percent slopes

Setting

Landscape: Hills

Landform: Hillslopes

Major uses: Wildlife habitat

Elevation: 80 to 900 feet

Composition

San Germán and similar soils: 60 percent

Duey and similar soils: 40 percent

Typical Profiles

San Germán

Surface layer:

0 to 4 inches—very dark grayish brown cobbly clay loam

4 to 10 inches—very dark grayish brown extremely gravelly clay loam

Bedrock:

10 to 80 inches—hard, consolidated limestone bedrock

Duey

Surface layer:

0 to 8 inches—very dark grayish brown gravelly clay loam

8 to 13 inches—brown very gravelly clay loam

Substratum:

13 to 17 inches—yellowish brown extremely gravelly clay loam

Bedrock:

17 to 35 inches—highly fractured limestone

35 inches—hard, consolidated limestone bedrock

Minor Components

Dissimilar:

- Scattered areas of limestone rock outcrop

Soil Properties and Qualities

Depth class: Shallow

Depth to bedrock: San Germán—10 to 20 inches; Duey—10 to 20 inches to highly fractured limestone and 30 to 55 inches to unweathered limestone bedrock

Parent material: Material that weathered from limestone bedrock from the Cretaceous period

Surface runoff: Very high

Drainage class: Well drained

Permeability: Very slow

Available water capacity: Very low

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: San Germán—10 to 60 percent, by volume, mostly pebbles and cobbles; Duey—10 to 60 percent, by volume, mostly pebbles

Extent of rock outcrop: Less than 5 percent

Shrink-swell potential: Low

Natural fertility: Low

Content of organic matter in the surface layer: Moderate

Reaction: San Germán—slightly alkaline or moderately alkaline throughout; Duey—neutral to moderately alkaline throughout

Land Use

Dominant uses: Wildlife habitat

Other uses: Naturalized pastureland

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Very low available water capacity; depth to rock; slope

Pasture and hayland

Suitability: San Germán—unsited to pasture and hayland; Duey—poorly suited to pasture and unsited to hayland

Commonly grown crops: Buffelgrass; guineagrass; pangola grass

Management concerns: Very low available water capacity; depth to rock; slope

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Very low available water capacity; depth to rock; slope

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.
- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- Planning road grades so that the removal of rock is not necessary and ripping the bedrock help to overcome the restricted depth to rock.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Depth to rock; slope; large stones

Management measures and considerations:

- Cutting and filling, designing structures to conform to the contour of the natural slope, or using the less sloping areas helps to overcome the slope limitation.

- A properly designed, alternate onsite sewage system can help to overcome the restricted depth to rock.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: San Germán—unsuited; Duey—poorly suited

Management concerns: Depth to rock; slope; large stones

Management measures and considerations:

- Establishing a suitable bed of topsoil helps to overcome the restricted depth to rock.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: San Germán—unsuited; Duey—poorly suited to unsuited

Management concerns: Depth to rock; slope; large stones

Management measures and considerations:

- Establishing a suitable bed of topsoil helps to overcome the restricted depth to rock.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope; large stones

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: San Germán—VII_s; Duey—VII_s

SiA—Santa Isabel clay, 0 to 2 percent slopes

Setting

Landscape: Basins

Landform: Fan skirts

Major uses: Hayland, pasture, and cropland

Elevation: Sea level to 165 feet

Composition

Santa Isabel and similar soils: 95 percent

Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 10 inches—black clay

Subsurface layer:

10 to 28 inches—black clay

28 to 39 inches—very dark gray clay

39 to 50 inches—very dark gray clay

50 to 64 inches—black clay

Subsoil:

64 to 69 inches—dark brown clay

Minor Components

Similar:

- Fraternidad soils that are in positions similar to those of the Santa Isabel soil but have calcium carbonate accumulations in the upper part of the subsoil

Soil Properties and Qualities

Depth class: Very deep

Parent material: Clayey alluvial sediments that weathered from igneous, metamorphic, and sedimentary rocks

Surface runoff: Medium

Drainage class: Moderately well drained

Permeability: Very slow

Available water capacity: High

Seasonal high water table: Apparent, at a depth of 5 to 6 feet from September through November

Flooding: None

Hazard of water erosion: Moderate to severe

Shrink-swell potential: Very high

Natural fertility: High

Content of organic matter in the surface layer: Moderate to high

Reaction: Neutral or slightly alkaline throughout

Land Use

Dominant uses: Hayland

Other uses: Pasture; cropland

Agricultural Development

Cropland

Suitability: Well suited

Commonly grown crops: Rice; sugar cane; cash crops

Management concerns: Tilth

Management measures and considerations:

- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.

Pasture and hayland

Suitability: Well suited

Commonly grown crops: Buffelgrass; guineagrass; hurricanegrass; Kleberg's bluestem

Management concerns: Tilth

Management measures and considerations:

- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Well suited

Management concerns: Tilth

Management measures and considerations:

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Shrink-swell potential

Management measures and considerations:

- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Very slow permeability

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Shrink-swell potential; low strength

Management measures and considerations:

- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Moderately suited

Management concerns: Very slow permeability; too clayey

Picnic areas

Suitability: Moderately suited

Management concerns: Very slow permeability; too clayey

Playgrounds

Suitability: Moderately suited

Management concerns: Very slow permeability; too clayey

Paths and trails

Suitability: Moderately suited

Management concerns: Too clayey

Interpretive Group

Land capability classification: IIIc

SmE—Santa Marta gravelly clay loam, 20 to 40 percent slopes

Setting

Landscape: Hills

Landform: Hillslopes

Major uses: Forestland and urban development

Elevation: 160 to 330 feet

Composition

Santa Marta and similar soils: 95 percent

Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 8 inches—dark brown gravelly clay loam

Subsoil:

8 to 21 inches—dark reddish brown paragravelly clay

21 to 37 inches—dark reddish brown very paragravelly clay

Bedrock:

37 to 57 inches—highly fractured serpentinite bedrock

57 inches—hard, consolidated serpentinite bedrock

Minor Components

Dissimilar:

- El Cacique and La Taína soils, which have a coarser textured profile than the Santa Marta soil and are shallow to serpentinite bedrock
- Maresúa soils, which have a coarser textured profile than the Santa Marta soil and are moderately deep to serpentinite bedrock

Soil Properties and Qualities

Depth class: Moderately deep

Depth to bedrock: 14 to 64 inches

Parent material: Residuum that weathered from serpentinite bedrock

Surface runoff: High

Drainage class: Well drained

Permeability: Moderate

Available water capacity: High

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: 5 to 20 percent, by volume, pebbles

Shrink-swell potential: Low

Natural fertility: Low

Content of organic matter in the surface layer: High

Reaction: Strongly acid to neutral throughout

Land Use

Dominant uses: Forestland

Other uses: Urban development

Agricultural Development

Cropland

Suitability: Poorly suited

Management concerns: Soil fertility; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Poorly suited to pasture; unsuited to hayland

Commonly grown crops: Guineagrass; pangola grass; African star grass

Management concerns: Erosion; slope; weed competition

Management measures and considerations:

- Erosion is a concern in unprotected areas.

- Overgrazed pastures should be reestablished and then protected from further overgrazing.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Preparing seedbeds on the contour or across the slope helps to control erosion and increases the rate of germination.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Mechanical and chemical means can be used to help control competition from weeds.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Erosion; slope

Management measures and considerations:

- Erosion is a concern in unprotected areas.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Poorly suited

Management concerns: Slope

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Depth to rock; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; slope

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Poorly suited

Management concerns: Too clayey; slope

Management measures and considerations:

- Designing paths and trails to conform to the contour and providing adequate water-control structures help to maintain the stability of the paths and trails.

Interpretive Group

Land capability classification: VIe

SoC—Seboruco silty clay loam, 2 to 12 percent slopes

Setting

Landscape: Hills

Landform: Ridges and hillslopes

Major uses: Wildlife habitat

Elevation: 80 to 250 feet

Composition

Seboruco and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 2 inches—dusky red silty clay loam

Subsoil:

2 to 7 inches—dark reddish brown silty clay loam

7 to 11 inches—dark red gravelly silty clay

11 to 26 inches—reddish yellow gravelly silt loam that has pink, soft masses of calcium carbonate

Substratum:

26 to 31 inches—red loam that has pink, soft masses of calcium carbonate

Bedrock:

31 inches—hard, consolidated limestone bedrock

Minor Components

Dissimilar:

- La Covana soils that are in positions similar to those of the Seboruco soil but are shallow to hardpan
- Small areas of limestone outcrop

Soil Properties and Qualities

Depth class: Moderately deep

Depth to bedrock: 20 to 40 inches

Parent material: Shallow marine sediments overlying limestone bedrock

Surface runoff: High or very high
Drainage class: Well drained
Permeability: Slow
Available water capacity: Very low
Seasonal high water table: None within a depth of 80 inches
Flooding: None
Hazard of water erosion: Moderate to severe
Rock fragments in the surface layer: 15 to 25 percent, by volume, pebbles
Shrink-swell potential: Low
Natural fertility: Moderate
Content of organic matter in the surface layer: Moderate
Reaction: Moderately alkaline throughout

Land Use

Dominant uses: Wildlife habitat
Other uses: Forestland

Agricultural Development

Cropland

Suitability: Poorly suited
Management concerns: Slope; very low available water capacity

Pasture and hayland

Suitability: Poorly suited
Commonly grown crops: Buffelgrass; guineagrass
Management concerns: Slope
Management measures and considerations:

- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity during the establishment, maintenance, or renovation of hayland and pasture.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Poorly suited
Commonly grown crops: Guineagrass
Management concerns: Slope
Management measures and considerations:

- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity during the establishment, maintenance, or renovation of pasture.
- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Moderately suited
Management concerns: Slope; depth to rock
Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.
- Ripping the bedrock or using fill material helps to overcome the restricted depth to rock.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Slope; depth to bedrock

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Moderately suited

Management concerns: Slope; small stones; depth to bedrock

Management measures and considerations:

- Cutting and filling, designing structures to conform to the contour of the natural slope, or using the less sloping areas helps to overcome the slope limitation.
- A properly designed, alternate onsite sewage system can help to overcome the restricted depth to rock.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Picnic areas

Suitability: Moderately suited

Management concerns: Slope; small stones

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Playgrounds

Suitability: Moderately suited

Management concerns: Slope; small stones

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Paths and trails

Suitability: Suited

Interpretive Group

Land capability classification: IVs

SsB—Sosa sandy loam, 2 to 5 percent slopes

Setting

Landscape: Coastal plains

Landform: Marine terraces

Major uses: Urban development

Elevation: 15 to 115 feet

Composition

Sosa and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 12 inches—dark reddish brown sandy loam that has ironstone nodules

Subsurface layer:

12 to 20 inches—dark red and dark reddish brown sandy clay that has ironstone nodules

Subsoil:

20 to 33 inches—red sandy clay that has ironstone nodules and dark red, strong brown, and light gray reticulate mottles

33 to 63 inches—red sandy clay loam that has ironstone nodules and dark red, strong brown, and light gray reticulate mottles

Minor Components

Dissimilar:

- Bahía and Guayabo soils, which have a coarser textured profile than the Sosa soil and are in the lower positions

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 60 inches

Parent material: Clayey and loamy marine sediments

Surface runoff: Medium

Drainage class: Well drained

Permeability: Moderately slow

Available water capacity: Low

Seasonal high water table: None within a depth of 60 inches

Flooding: None

Hazard of water erosion: Moderate

Rock fragments in the surface layer: Less than 15 percent, by volume, ironstone nodules

Shrink-swell potential: Low

Natural fertility: Low

Content of organic matter in the surface layer: Low

Reaction: Moderately acid or slightly acid in the surface and subsurface layers and slightly acid or neutral in the subsoil

Land Use

Dominant uses: Urban development

Other uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Suited

Commonly grown crops: Watermelons; pumpkins

Management concerns: Low available water capacity; soil fertility

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Poorly suited

Commonly grown crops: Guineagrass; buffelgrass

Management concerns: Very low available water capacity

Management measures and considerations:

- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity during the establishment, maintenance, or renovation of hayland and pasture.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Poorly suited

Commonly grown crops: Guineagrass

Management concerns: Very low available water capacity

Management measures and considerations:

- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity during the establishment, maintenance, or renovation of pasture.
- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Well suited

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Slow permeability

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Moderately suited

Management concerns: Low strength

Management measures and considerations:

- Incorporating gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Moderately suited

Management concerns: Slow permeability; too sandy

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Picnic areas

Suitability: Moderately suited

Management concerns: Slow permeability; too sandy

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Playgrounds

Suitability: Suited

Management concerns: Slope; too sandy

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Paths and trails

Suitability: Suited

Management concerns: Too sandy

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Interpretive Group

Land capability classification: IIIc

SsC—Sosa sandy loam, 5 to 12 percent slopes

Setting

Landscape: Coastal plains

Landform: Marine terraces

Major uses: Urban development

Elevation: 15 to 115 feet

Composition

Sosa and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 12 inches—dark reddish brown sandy loam that has ironstone nodules

Subsurface layer:

12 to 20 inches—dark red and dark reddish brown sandy clay that has ironstone nodules

Subsoil:

20 to 33 inches—red sandy clay that has ironstone nodules and dark red, strong brown, and light gray reticulate mottles

33 to 63 inches—red sandy clay loam that has ironstone nodules and dark red, strong brown, and light gray reticulate mottles

Minor Components

Dissimilar:

- Bahía and Guayabo soils, which have a coarser textured profile than the Sosa soil and are in the lower positions

Similar:

- Less sloping Sosa soils

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 60 inches

Parent material: Clayey and loamy marine sediments

Surface runoff: Medium

Drainage class: Well drained

Permeability: Moderately slow

Available water capacity: Low

Seasonal high water table: None within a depth of 60 inches

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: Less than 15 percent, by volume, ironstone nodules

Shrink-swell potential: Low

Natural fertility: Low

Content of organic matter in the surface layer: Low

Reaction: Moderately acid or slightly acid in the surface and subsurface layers and slightly acid or neutral in the subsoil

Land Use

Dominant uses: Urban development

Other uses: Wildlife habitat

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Watermelons; pumpkins

Management concerns: Very low available water capacity; soil fertility; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Poorly suited

Commonly grown crops: Guineagrass; buffelgrass

Management concerns: Very low available water capacity

Management measures and considerations:

- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity during the establishment, maintenance, or renovation of hayland and pasture.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Poorly suited

Commonly grown crops: Guineagrass

Management concerns: Very low available water capacity

Management measures and considerations:

- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity during the establishment, maintenance, or renovation of pasture.
- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Suited

Management concerns: Slope

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Slow permeability

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Moderately suited

Management concerns: Slope

Management measures and considerations:

- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Suited

Management concerns: Slope; slow permeability; too sandy

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- Filling the selected area with suitable material from an offsite location can improve soil performance.

Picnic areas

Suitability: Suited

Management concerns: Slope; slow permeability; too sandy

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- Filling the selected area with suitable material from an offsite location can improve soil performance.

Playgrounds

Suitability: Suited to poorly suited

Management concerns: Slope; too sandy

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- Filling the selected area with suitable material from an offsite location can improve soil performance.

Paths and trails

Suitability: Suited

Management concerns: Slope; too sandy

Management measures and considerations:

- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Interpretive Group

Land capability classification: IIIc

TeA—Teresa clay, 0 to 1 percent slopes

Setting

Landscape: Coastal plains

Landform: Alluvial flats

Major uses: Pasture; naturalized pastureland

Elevation: Sea level to 100 feet

Composition

Teresa and similar soils: 95 percent

Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 10 inches—very dark gray clay

Subsoil:

10 to 26 inches—very dark gray clay

26 to 38 inches—very dark grayish brown clay that has yellowish brown mottles

38 to 44 inches—very dark grayish brown clay that has yellowish brown mottles and salt crystals

44 to 62 inches—dark brown clay that has olive brown mottles and salt crystals

62 to 78 inches—brown clay that has dark gray and yellowish brown mottles and salt crystals

78 to 85 inches—dark gray clay that has yellowish brown mottles and salt crystals

Minor Components

Dissimilar:

- A ponded phase of Teresa soils that is poorly drained and is in the lower positions

Soil Properties and Qualities

Depth class: Very deep

Parent material: Clayey, alluvial and marine sediments

Surface runoff: Negligible

Drainage class: Somewhat poorly drained

Permeability: Moderately slow

Available water capacity: Moderate or high

Seasonal high water table: Apparent, at a depth of 2½ to 3½ feet from August through October

Flooding: None

Hazard of water erosion: Slight

Shrink-swell potential: High

Natural fertility: Low

Content of organic matter in the surface layer: Moderate

Reaction: Moderately alkaline or strongly alkaline

Salinity: Moderately saline or strongly saline throughout

Sodicity: Slight or moderate throughout

Land Use

Dominant uses: Pasture

Other uses: Naturalized pastureland

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Salinity; seasonal wetness; sodicity

Management measures and considerations:

- Salinity, sodicity, and seasonal wetness limit the use of this soil.

Pasture and hayland

Suitability: Suited to pasture; poorly suited to hayland

Commonly grown crops: Kleberg's bluestem

Management concerns: Salinity; seasonal wetness; sodicity

Management measures and considerations:

- Salinity, sodicity, and seasonal wetness limit the use of this soil.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Suited

Management concerns: Salinity; seasonal wetness; sodicity

Management measures and considerations:

- Salinity, sodicity, and seasonal wetness limit the use of this soil.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Unsited

Management concerns: Shrink-swell potential; wetness

Management measures and considerations:

- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.
- Constructing dwellings on raised, well-compacted fill material reduces the risk of damage from wetness.

Septic tank absorption fields

Suitability: Unsited

Management concerns: Restricted permeability; wetness

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; shrink-swell potential; wetness

Management measures and considerations:

- Removing as much of the clay that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Constructing roads on raised, well-compacted fill material helps to overcome the wetness.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Too clayey; wetness; excess salt

Management measures and considerations:

- The installation of a system to control drainage and flooding can help to overcome the limitations.

Picnic areas

Suitability: Poorly suited

Management concerns: Too clayey; wetness; excess salt

Management measures and considerations:

- The installation of a system to control drainage and flooding can help to overcome the limitations.

Playgrounds

Suitability: Poorly suited

Management concerns: Too clayey; wetness; excess salt

Management measures and considerations:

- The installation of a system to control drainage and flooding can help to overcome the limitations.

Paths and trails

Suitability: Poorly suited

Management concerns: Low strength; too clayey; wetness

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Constructing paths and trails on raised, well-compacted fill material helps to overcome the wetness.

Interpretive Group

Land capability classification: IVs

TfA—Teresa clay, ponded

Setting

Landscape: Coastal plains

Landform: Alluvial flats

Major uses: Wildlife habitat

Elevation: Sea level to 100 feet

Composition

Teresa and similar soils: 95 percent

Dissimilar soils: 5 percent

Typical Profile

Surface layer:

0 to 10 inches—very dark gray clay

Subsoil:

10 to 26 inches—very dark gray clay

26 to 38 inches—very dark grayish brown clay that has yellowish brown mottles

38 to 44 inches—very dark grayish brown clay that has yellowish brown mottles and salt crystals

44 to 62 inches—dark brown clay that has olive brown mottles and salt crystals

62 to 78 inches—brown clay that has dark gray and yellowish brown mottles and salt crystals

78 to 85 inches—dark gray clay that has yellowish brown mottles and salt crystals

Minor Components

Dissimilar:

- Manglillo soils, which are derived from organic materials, are poorly drained, and are in the lower positions.
- Boquerón and Serrano soils, which are poorly drained and are in the lower positions

Soil Properties and Qualities

Depth class: Very deep

Parent material: Clayey marine sediments

Surface runoff: Negligible

Drainage class: Somewhat poorly drained

Permeability: Very slow

Available water capacity: High

Seasonal high water table: Apparent, at a depth of 2½ to 3½ feet from August through October

Ponding: Occasional, long duration

Hazard of water erosion: Slight

Shrink-swell potential: High

Natural fertility: Low

Content of organic matter in the surface layer: Moderate

Reaction: Moderately alkaline or strongly alkaline

Salinity: Moderately saline or strongly saline throughout

Sodicity: Slight or moderate throughout

Land Use

Dominant uses: Wildlife habitat

Other uses: Naturalized pastureland

Agricultural Development

Cropland

Suitability: Unsited

Management concerns: Salinity; wetness; sodicity

Pasture and hayland

Suitability: Poorly suited to pasture; unsited to hayland

Management concerns: Salinity; wetness; sodicity

Management measures and considerations:

- Salinity, sodicity, and wetness limit the use of this soil.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Poorly suited

Management concerns: Wetness

Management measures and considerations:

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Unsited

Management concerns: Shrink-swell potential; wetness

Septic tank absorption fields

Suitability: Unsited

Management concerns: Restricted permeability; wetness

Local roads and streets

Suitability: Unsited

Management concerns: Low strength; shrink-swell potential; wetness

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Constructing roads on raised, well-compacted fill material helps to overcome the wetness.

Recreational Development

Camp areas

Suitability: Unsited

Management concerns: Too clayey; wetness; excess salt

Management measures and considerations:

- The installation of a system to control drainage and flooding can help to overcome the limitations.

Picnic areas

Suitability: Unsited

Management concerns: Too clayey; wetness; excess salt

Management measures and considerations:

- The installation of a system to control drainage and flooding can help to overcome the limitations.

Playgrounds

Suitability: Unsited

Management concerns: Too clayey; wetness; excess salt

Management measures and considerations:

- The installation of a system to control drainage and flooding can help to overcome the limitations.

Paths and trails

Suitability: Poorly suited

Management concerns: Low strength; too clayey; wetness

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Constructing paths and trails on raised, well-compacted fill material helps to overcome the wetness.

Interpretive Group

Land capability classification: VIw

ToA—Toa clay loam, 0 to 2 percent slopes, occasionally flooded

Setting

Landscape: River valleys

Landform: Flood plains

Major uses: Pasture

Elevation: Sea level to 160 feet

Composition

Toa and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 8 inches—dark brown clay loam

Subsurface layer:

8 to 17 inches—dark brown clay loam

Subsoil:

17 to 29 inches—dark yellowish brown silty clay loam that has dark brown mottles

29 to 43 inches—dark brown silty clay loam that has reddish brown mottles

43 to 65 inches—dark yellowish brown clay loam that has manganese concretions and yellowish brown and light gray mottles

Minor Components

Dissimilar:

- Bajura soils, which are poorly drained and are in the lower positions
- Coloso soils, which are somewhat poorly drained and are in the lower positions

Soil Properties and Qualities

Depth class: Very deep

Parent material: Stratified alluvium of mixed origin

Surface runoff: Negligible to low

Drainage class: Well drained

Permeability: Moderate

Available water capacity: High

Seasonal high water table: None within a depth of 60 inches

Flooding: Occasional, brief duration

Hazard of water erosion: Slight

Shrink-swell potential: Moderate

Natural fertility: High

Content of organic matter in the surface layer: Moderate

Reaction: Strongly acid to neutral in the surface and subsurface layers and slightly alkaline in the subsoil

Land Use

Dominant uses: Pasture

Other uses: Cropland

Agricultural Development

Cropland

Suitability: Well suited

Commonly grown crops: Sugar cane

Management concerns: Seasonal wetness

Management measures and considerations:

- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.

Pasture and hayland

Suitability: Well suited

Commonly grown crops: Pangola grass; African star grass; merker grass; guineagrass

Management concerns: Seasonal wetness

Management measures and considerations:

- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.
- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.

Naturalized pastureland

Suitability: Well suited

Management concerns: Seasonal wetness

Management measures and considerations:

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Unsited

Management concerns: Flooding

Septic tank absorption fields

Suitability: Unsited

Management concerns: Flooding

Local roads and streets

Suitability: Unsited

Management concerns: Low strength; seasonal wetness

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Unsited

Management concerns: Flooding

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location helps to minimize wetness.

Picnic areas

Suitability: Unsited

Management concerns: Flooding

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location helps to minimize wetness.

Playgrounds

Suitability: Unsited

Management concerns: Flooding

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location helps to minimize wetness.

Paths and trails

Suitability: Poorly suited

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location helps to minimize wetness.

Interpretive Group

Land capability classification: IIw

Ua—Urban land

Setting

Landscape: Coastal plains and hills

Landform: Flood plains, uplands, and hillslopes

Composition

This map unit is a miscellaneous land type consisting of areas covered by streets, buildings, sidewalks, parking lots, playgrounds, and residential development. The original soils on this map unit have been highly disturbed by mechanical means.

Soil Properties and Qualities

Because of the diversity of this map unit, onsite investigation is needed.

Minor Components

Some areas contain minor inclusions of the original soil material.

Land Use

Dominant uses: Urban development; residential development

Agricultural Development

Cropland

- This map unit is severely limited as cropland. A site that has better suited soils should be selected.

Pasture and hayland

- This map unit is severely limited as pasture and hayland. A site that has better suited soils should be selected.

Naturalized pastureland

- This map unit is severely limited as naturalized pastureland. A site that has better suited soils should be selected.

Urban Development

Dwellings

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as sites for dwellings.
- Onsite investigation is needed prior to construction.

Septic tank absorption fields

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as sites for septic tank absorption fields.
- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as sites for local roads and streets.
- Onsite investigation is needed prior to construction.

- Vegetating disturbed areas and using erosion-control structures, such as sediment fences and sediment catch basins, help to keep soil on the site. These practices should be used during any development.

Recreational Development

Camp areas

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as camp areas.

Picnic areas

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as picnic areas.

Playgrounds

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as sites for playgrounds.

Paths and trails

Suitability: No suitability class assigned

Management concerns: Soil disturbance

Management measures and considerations:

- Because of the extensive disturbance, most areas of this unit are unsuitable as sites for paths and trails.

Interpretive Group

Land capability classification: None assigned

UbB—Urban land-Bahía complex, 0 to 5 percent slopes

Setting

Landscape: Coastal plains

Landform: Uplands

Major uses: Urban land

Elevation: 15 to 80 feet

Composition

Urban land and similar areas: 85 percent

Bahía and similar soils: 10 percent

Dissimilar soils: 5 percent

Typical Profile

Bahía

Surface layer:

0 to 6 inches—dark reddish brown fine sand that has manganese concretions

Subsoil:

6 to 17 inches—dark reddish brown loamy sand

17 to 26 inches—dark red sand
26 to 45 inches—dark reddish brown loamy sand
45 to 67 inches—dark reddish brown fine sandy loam

Minor Components

Dissimilar:

- Sosa soils, which have a finer textured profile than the Bahía soil and are in the higher positions

Similar:

- Guayabo soils that are in positions similar to those of the Bahía soil but have mixed mineralogy

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Sandy marine deposits

Surface runoff: Urban land—not rated; Bahía—negligible

Drainage class: Excessively drained

Permeability: Rapid

Available water capacity: Very low

Seasonal high water table: None within a depth of 80 inches

Flooding: None

Hazard of water erosion: Low

Rock fragments in the surface layer: Less than 2 percent, by volume

Shrink-swell potential: Low

Natural fertility: Low

Content of organic matter in the surface layer: Low

Reaction: Strongly acid or moderately acid in the surface layer and strongly acid to neutral in the subsoil

Land Use

Dominant uses: Urban development

Other uses: Cropland

Onsite investigation is needed prior to development in the areas of Urban land.

Agricultural Development (Bahía Soil)

Cropland

Suitability: Poorly suited

Commonly grown crops: Watermelons; root crops; vegetables

Management concerns: Very low available water capacity

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Moderately suited

Commonly grown crops: Buffelgrass; hurricanegrass; Kleberg's bluestem

Management concerns: Very low available water capacity

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.

- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Moderately suited

Commonly grown crops: Buffelgrass; hurricanegrass; Kleberg's bluestem

Management concerns: Very low available water capacity

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development (Bahía Soil)

Dwellings

Suitability: Suited

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Poor filtering capacity

Management measures and considerations:

- If the density of the housing is moderate to high, a community sewage system is needed to prevent contamination by seepage.
- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Suited

Recreational Development (Bahía Soil)

Camp areas

Suitability: Poorly suited

Management concerns: Too sandy

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Picnic areas

Suitability: Poorly suited

Management concerns: Too sandy

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Playgrounds

Suitability: Poorly suited

Management concerns: Too sandy

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Paths and trails

Suitability: Poorly suited

Management concerns: Too sandy

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Interpretive Group

Land capability classification: Urban land—none assigned; Bahía—IIIs

UgB—Urban land-Guayabo complex, 0 to 5 percent slopes

Setting

Landscape: Coastal plains
Landform: Coastal beaches
Major uses: Urban land
Elevation: 15 to 80 feet

Composition

Urban land and similar areas: 85 percent
Guayabo and similar soils: 10 percent
Dissimilar soils: 5 percent

Typical Profile

Guayabo

Surface layer:

0 to 7 inches—brown sand
7 to 13 inches—pale brown sand
13 to 18 inches—pale brown fine sand that has strong brown stains
18 to 35 inches—very pale brown sand that has strong brown stains
35 to 55—very pale brown sand

Subsoil:

55 to 65 inches—very pale brown fine sand that has yellowish red mottles
65 to 75 inches—mottled red, strong brown, and pale brown loamy sand

Minor Components

Dissimilar:

- Sosa soils, which have a finer textured profile than the Guayabo soil and are in the higher positions

Similar:

- Bahía soils that are in positions similar to those of the Guayabo soil but have kaolinitic mineralogy

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 80 inches

Parent material: Sandy marine deposits

Surface runoff: Urban land—not rated; Guayabo—Negligible

Drainage class: Excessively drained

Permeability: Rapid

Available water capacity: Very low

Seasonal high water table: None within a depth of 80 inches

Flooding: None

Hazard of water erosion: Low

Rock fragments in the surface layer: Less than 2 percent, by volume, pebbles

Rock fragments in the subsoil: 0 to less than 15 percent, by volume, pebbles

Shrink-swell potential: Low

Natural fertility: Low

Content of organic matter in the surface layer: Low

Reaction: Slightly acid to moderately alkaline throughout

Land Use

Dominant uses: Urban development

Other uses: Cropland

Onsite investigation is needed prior to development in the areas of Urban land.

Agricultural Development (Guayabo Soil)

Cropland

Suitability: Poorly suited

Commonly grown crops: Watermelons; root crops; vegetables

Management concerns: Very low available water capacity

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- A conservation tillage system increases the content of organic matter in the soil, increases soil moisture, helps to maintain tilth, and reduces the hazard of erosion.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Moderately suited

Commonly grown crops: Buffelgrass; guineagrass; hurricanegrass; Kleberg's bluestem

Management concerns: Very low available water capacity

Management measures and considerations:

- Returning crop residue to the soil improves the retention of soil moisture and increases the supply of plant nutrients.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Moderately suited

Commonly grown crops: Buffelgrass; guineagrass; hurricanegrass; Kleberg's bluestem

Management concerns: Very low available water capacity

Management measures and considerations:

- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development (Guayabo Soil)

Dwellings

Suitability: Poorly suited

Management concerns: Instability of cutbanks

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Poor filtering capacity

Management measures and considerations:

- If the density of the housing is moderate to high, a community sewage system is needed to prevent contamination by seepage.
- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Suited

Recreational Development (Guayabo Soil)

Camp areas

Suitability: Poorly suited

Management concerns: Too sandy

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Picnic areas

Suitability: Poorly suited

Management concerns: Too sandy

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Playgrounds

Suitability: Poorly suited

Management concerns: Too sandy

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Paths and trails

Suitability: Poorly suited

Management concerns: Too sandy

Management measures and considerations:

- Filling the selected area with suitable material from an offsite location can improve soil performance.

Interpretive Group

Land capability classification: Urban land—None assigned; Guayabo—IIIs

UsC—Urban land-Sosa complex, 5 to 12 percent slopes

Setting

Landscape: Coastal plains

Landform: Marine terraces

Major uses: Urban development

Elevation: 15 to 115 feet

Composition

Urban land and similar areas: 80 percent

Sosa and similar soils: 15 percent

Dissimilar soils: 5 percent

Typical Profile

Sosa

Surface layer:

0 to 12 inches—dark reddish brown sandy loam that has ironstone nodules

Subsurface layer:

12 to 20 inches—red and dark reddish brown sandy clay that has ironstone nodules

Subsoil:

20 to 33 inches—red sandy clay that has ironstone nodules and dark red, strong brown, and light gray reticulate mottles

33 to 63 inches—red sandy clay loam that has ironstone nodules and dark red, strong brown, and light gray reticulate mottles

Minor Components

Dissimilar:

- Bahía and Guayabo soils, which have a coarser textured profile than the Sosa soil and are in the lower positions

Similar:

- Gently sloping Sosa soils

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 60 inches

Parent material: Clayey and loamy marine sediments

Surface runoff: Urban land—not rated; Sosa—medium

Drainage class: Well drained

Permeability: Moderate

Available water capacity: Low

Seasonal high water table: None within a depth of 60 inches

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: Less than 15 percent, by volume, ironstone nodules

Shrink-swell potential: Low

Natural fertility: Low

Content of organic matter in the surface layer: Low

Reaction: Moderately acid or slightly acid in the surface and subsurface layers and slightly acid or neutral in the subsoil

Land Use

Dominant uses: Urban development

Other uses: Recreational development

Onsite investigation is needed prior to development in the areas of Urban land.

Agricultural Development (Sosa Soil)

Cropland

Suitability: Poorly suited

Commonly grown crops: Watermelons; pumpkins

Management concerns: Very low available water capacity; soil fertility; slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Poorly suited

Commonly grown crops: Guineagrass; buffelgrass

Management concerns: Very low available water capacity

Management measures and considerations:

- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity during the establishment, maintenance, or renovation of hayland and pasture.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Poorly suited

Commonly grown crops: Guineagrass

Management concerns: Very low available water capacity

Management measures and considerations:

- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity during the establishment, maintenance, or renovation of pasture.
- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development (Sosa Soil)

Dwellings

Suitability: Suited

Management concerns: Slope

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Slow permeability

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Moderately suited

Management concerns: Low strength; slope

Management measures and considerations:

- Incorporating gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development (Sosa Soil)

Camp areas

Suitability: Suited

Management concerns: Slope; slow permeability; too sandy

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- Filling the selected area with suitable material from an offsite location can improve soil performance.

Picnic areas

Suitability: Suited

Management concerns: Slope; slow permeability; too sandy

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- Filling the selected area with suitable material from an offsite location can improve soil performance.

Playgrounds

Suitability: Suited

Management concerns: Slope; too sandy

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- Filling the selected area with suitable material from an offsite location can improve soil performance.

Paths and trails

Suitability: Suited

Management concerns: Slope; too sandy

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.
- Filling the selected area with suitable material from an offsite location can improve soil performance.

Interpretive Group

Land capability classification: Urban land—None assigned; Sosa—IIIs

VaA—Vayas silty clay, 0 to 2 percent slopes, occasionally flooded

Setting

Landscape: River valleys

Landform: Flood plains

Major uses: Cropland

Elevation: Sea level to 20 feet

Composition

Vayas and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 5 inches—very dark grayish brown silty clay

Subsoil:

5 to 12 inches—very dark grayish brown silty clay loam

12 to 23 inches—dark grayish brown silty clay loam that has dark yellowish brown and very dark greenish gray mottles

Substratum:

23 to 49 inches—olive gray and brown silty clay loam that has dark yellowish brown and very dark greenish gray mottles

49 to 65 inches—olive gray silty clay loam that has dark yellowish brown and dark greenish gray mottles

Minor Components

Dissimilar:

- Cortada, La Luna, and San Antón soils that are in positions similar to those of the Vayas soil but are well drained

Soil Properties and Qualities

Depth class: Very deep

Parent material: Fine textured alluvium of mixed origin

Soil Survey of San Germán Area, Puerto Rico

Surface runoff: Negligible to low

Drainage class: Poorly drained

Permeability: Slow

Available water capacity: Moderate or high

Seasonal high water table: Apparent, at a depth of 1 to 2½ feet from September through October

Flooding: Occasional, brief duration

Hazard of water erosion: Slight

Shrink-swell potential: Moderate

Natural fertility: High

Content of organic matter in the surface layer: Moderate

Reaction: Neutral to moderately alkaline throughout

Land Use

Dominant uses: Cropland

Other uses: Pasture

Agricultural Development

Cropland

Suitability: Well suited

Commonly grown crops: Bananas; plantains; cash crops

Management concerns: Seasonal wetness

Management measures and considerations:

- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Restricting fieldwork to periods when the soil is not wet helps to prevent rutting and the compaction caused by the high content of clay in the soil.

Pasture and hayland

Suitability: Well suited

Commonly grown crops: Kleberg's bluestem; hurricanegrass; para grass

Management concerns: Seasonal wetness

Management measures and considerations:

- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Naturalized pastureland

Suitability: Well suited

Management concerns: Seasonal wetness

Management measures and considerations:

- Preventing overgrazing and restricting grazing to periods when the soil is not too wet help to prevent soil compaction and to maintain productivity and tilth.

Urban Development

Dwellings

Suitability: Unsited

Management concerns: Flooding

Septic tank absorption fields

Suitability: Unsited

Management concerns: Deep water; restricted percolation; flooding

Local roads and streets

Suitability: Unsited

Management concerns: Deep water; low strength; flooding

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.

Recreational Development

Camp areas

Suitability: Unsited

Management concerns: Flooding

Picnic areas

Suitability: Unsited

Management concerns: Flooding

Playgrounds

Suitability: Unsited

Management concerns: Flooding

Paths and trails

Suitability: Poorly suited

Management concerns: Flooding

Interpretive Group

Land capability classification: IIIw

VoC—Voladora clay, 5 to 12 percent slopes

Setting

Landscape: Hills

Landform: Hillslopes

Major uses: Naturalized pastureland

Elevation: 30 to 250 feet

Composition

Voladora and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 2 inches—brown clay

Subsoil:

2 to 8 inches—dark reddish brown clay that has dark red mottles

8 to 15 inches—dark reddish brown clay

15 to 20 inches—dark reddish brown clay that has strong brown and very pale brown relic mottles and dark red plinthite

20 to 48 inches—dark yellowish brown clay that has strong brown and very pale brown relic and contemporary mottles and dark red plinthite

Substratum:

48 to 60 inches—brownish yellow clay that has dark red, strong brown, and white mottles

Minor Components

Dissimilar:

- Cabo Rojo and Delicias soils, which do not have plinthite in the subsoil and are in the lower positions

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 60 inches

Parent material: Fine textured volcanic and marine sediments

Surface runoff: Very high

Drainage class: Moderately well drained

Permeability: Slow

Available water capacity: Very high

Seasonal high water table: None within a depth of 60 inches

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: Less than 15 percent, by volume, pebbles

Shrink-swell potential: Moderate

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Extremely acid to strongly acid throughout

Land Use

Dominant uses: Naturalized pastureland

Other uses: Pasture; urban development

Agricultural Development

Cropland

Suitability: Suited to poorly suited

Commonly grown crops: Sugar cane

Management concerns: Slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Suited

Commonly grown crops: African star grass; merker grass; pangola grass

Management concerns: Slope

Management measures and considerations:

- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity during the establishment, maintenance, or renovation of hayland and pasture.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Suited

Commonly grown crops: Guineagrass

Management concerns: Slope

Management measures and considerations:

- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity during the establishment, maintenance, or renovation of pasture.

- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Suited

Management concerns: Slope; shrink-swell potential

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.
- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Slow permeability; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; shrink-swell potential; slope

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Removing as much of the layer that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Slope; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Cutting and filling or using the less sloping areas helps to overcome the slope limitation.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Paths and trails

Suitability: Poorly suited

Management concerns: Too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Interpretive Group

Land capability classification: IIIe

VoD—Voladora clay, 12 to 20 percent slopes

Setting

Landscape: Hills

Landform: Hillslopes

Major uses: Naturalized pastureland

Elevation: 30 to 250 feet

Composition

Voladora and similar soils: 90 percent

Dissimilar soils: 10 percent

Typical Profile

Surface layer:

0 to 2 inches—brown clay

Subsoil:

2 to 8 inches—dark reddish brown clay that has dark red mottles

8 to 15 inches—dark reddish brown clay

15 to 20 inches—dark reddish brown clay that has strong brown and very pale brown relic and contemporary mottles and dark red plinthite

20 to 48 inches—dark yellowish brown clay that has strong brown and very pale brown relic and contemporary mottles and dark red plinthite

Substratum:

48 to 60 inches—brownish yellow clay that has dark red, strong brown, and white mottles

Minor Components

Dissimilar:

- Cabo Rojo and Delicias soils, which do not have plinthite in the subsoil and are in the lower positions

Soil Properties and Qualities

Depth class: Very deep

Depth to bedrock: More than 60 inches

Parent material: Fine textured volcanic and marine sediments

Surface runoff: Very high

Drainage class: Moderately well drained

Permeability: Slow

Available water capacity: Very high

Seasonal high water table: None within a depth of 60 inches

Flooding: None

Hazard of water erosion: Severe

Rock fragments in the surface layer: Less than 15 percent, by volume, pebbles

Shrink-swell potential: Moderate

Natural fertility: Moderate

Content of organic matter in the surface layer: Moderate

Reaction: Extremely acid to strongly acid throughout

Land Use

Dominant uses: Naturalized pastureland

Other uses: Pasture; urban development

Agricultural Development

Cropland

Suitability: Poorly suited

Commonly grown crops: Sugar cane

Management concerns: Slope

Management measures and considerations:

- Using a resource management system that includes terraces and diversions, stripcropping, contour tillage, no-till planting, and crop residue management reduces the hazard of erosion, helps to control surface runoff, and maximizes rainfall infiltration.
- Restricting tillage to periods when the soil is not wet minimizes clodding and crusting.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity.

Pasture and hayland

Suitability: Suited to pasture; unsuited to hayland

Commonly grown crops: African star grass; merker grass; pangola grass

Management concerns: Slope

Management measures and considerations:

- Using rotational grazing and implementing a well planned schedule of clipping and harvesting help to maintain the pasture and increase productivity.
- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity during the establishment, maintenance, or renovation of hayland and pasture.
- Overgrazed pastures should be reestablished and then protected from further overgrazing.

Naturalized pastureland

Suitability: Suited

Commonly grown crops: Guineagrass

Management concerns: Slope

Management measures and considerations:

- Applying lime and fertilizer on the basis of soil testing increases the availability of nutrients to plants and maximizes productivity during the establishment, maintenance, or renovation of pasture.
- Overgrazed areas should be reestablished and then protected from further overgrazing.

Urban Development

Dwellings

Suitability: Suited to poorly suited

Management concerns: Slope; shrink-swell potential

Management measures and considerations:

- Designing structures to conform to the contour of the natural slope or building in the less sloping areas helps to overcome the slope limitation.
- Reinforcing foundations and footings or backfilling with coarse-textured material helps to strengthen buildings and to prevent the damage caused by shrinking and swelling.

Septic tank absorption fields

Suitability: Poorly suited

Management concerns: Slow permeability; slope

Management measures and considerations:

- The Rules and Permits Administration Agency can be contacted for assistance.

Local roads and streets

Suitability: Poorly suited

Management concerns: Low strength; shrink-swell potential; slope

Management measures and considerations:

- Incorporating sand and gravel into the roadbed and compacting the roadbed help to overcome the low strength of the natural soil material.
- Removing as much of the layer that has a high shrink-swell potential as possible and increasing the thickness of the base aggregate improve soil performance.
- Designing roads to conform to the contour and providing adequate water-control structures, such as culverts and gutters, help to maintain the stability of the road.

Recreational Development

Camp areas

Suitability: Poorly suited

Management concerns: Slope; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Picnic areas

Suitability: Poorly suited

Management concerns: Slope; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Playgrounds

Suitability: Poorly suited

Management concerns: Slope; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.
- Cutting and filling or building in the less sloping areas helps to overcome the slope limitation.

Paths and trails

Suitability: Poorly suited

Management concerns: Slope; too clayey

Management measures and considerations:

- A suitable cover of vegetation, mulch, or both can help to keep the topsoil in place.

Interpretive Group

Land capability classification: IVe

W—Water

This map unit is a miscellaneous area that consists of water bodies equal or greater than 40 acres in size. It commonly includes areas of reservoirs, artificial lakes, and rivers. Areas of this map unit are managed by the Puerto Rico Department of Environmental and Natural Resources.

Wc—Waters of the Caribbean

This map unit consists of the Caribbean Sea, which is the southern and western limit of the survey area.

Prime Farmland and Other Important Farmlands

Table 5 lists the map units in the survey area that are considered prime farmland, unique farmland, and farmland of statewide or local importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation's food supply.

Prime farmland is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

For some soils identified in the table as prime farmland, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures.

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed. The water supply is dependable and of adequate quality. Nearness to markets is an additional consideration. Unique farmland is not based on

national criteria. It commonly is in areas where there is a special microclimate, such as the coffee country in Puerto Rico.

In some areas, land that does not meet the criteria for prime or unique farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland and forestland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; for agricultural waste management; and as wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of gravel, sand, reclamation material, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Interpretive Ratings

The interpretive tables in this survey rate the soils in the survey area for various uses. Many of the tables identify the limitations that affect specified uses and indicate the severity of those limitations. The ratings in these tables are both verbal and numerical.

Rating Class Terms

Rating classes are expressed in the tables in terms that indicate the extent to which the soils are limited by all of the soil features that affect a specified use or in terms that indicate the suitability of the soils for the use. Thus, the tables may show limitation classes or suitability classes. Terms for the limitation classes are *not limited*, *somewhat limited*, and *very limited*. The suitability ratings are expressed as *well suited*, *moderately suited*, *poorly suited*, and *unsuited* or as *good*, *fair*, and *poor*.

Numerical Ratings

Numerical ratings in the tables indicate the relative severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate

gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation. The limitations appear in order from the most limiting to the least limiting. Thus, if more than one limitation is identified, the most severe limitation is listed first and the least severe one is listed last.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit (USDA, 1961).

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have slight limitations that restrict their use.

Class 2 soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that restrict the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that restrict the choice of plants or that require very careful management, or both.

Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

Class 8 soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, 2*e*. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *w*, *s*, or *c* because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, forestland, wildlife habitat, or recreation.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally

designated by adding an Arabic numeral to the subclass symbol, for example, 2e-4 and 3e-6. These units are not given in all soil surveys.

The capability classification of the soils in this survey area is given in the section "Detailed Soil Map Units" and in table 6.

Relations Among Soil, Fauna, and Flora

By Edwin G. Más, plant materials specialist, and Marisol Morales, biologist

The San Germán Soil Survey Area is comprised of four Major Land Resource Areas and includes four of the six ecological life zones described for Puerto Rico and the U.S. Virgin Islands (USDA, 2006; Ewel and Withmore, 1973). Table 7 shows relationships between MLRAs, ecological life zones, and selected areas of interest in the survey area.

Ecological life zones are major climatic divisions and define the conditions for ecosystem functioning. They are not defined by soil characteristics. The forests of Puerto Rico are tropical in the sense that they do not experience frost. In the life zone system described by Holdridge (1967), however, they are categorized as subtropical because of the relatively uniform and high biotemperature conditions on the island (Lugo, 2007). Table 8 lists common plants in the survey area.

Most of the survey area has been extensively disturbed for more than 300 years by farming, ranching, mining, urban development, and recreational use (fig. 14). Because of these severe anthropogenic disturbances, vegetation can be related to soil conditions only in a few instances. Examples are listed in table 9.

Currently, secondary forests and grazinglands are common, and introduced vegetation is present in many plant communities. Forestland, farmland, recreational land, urban land, and wildlife refuges are parts of the extensive variety in the ecosystem.

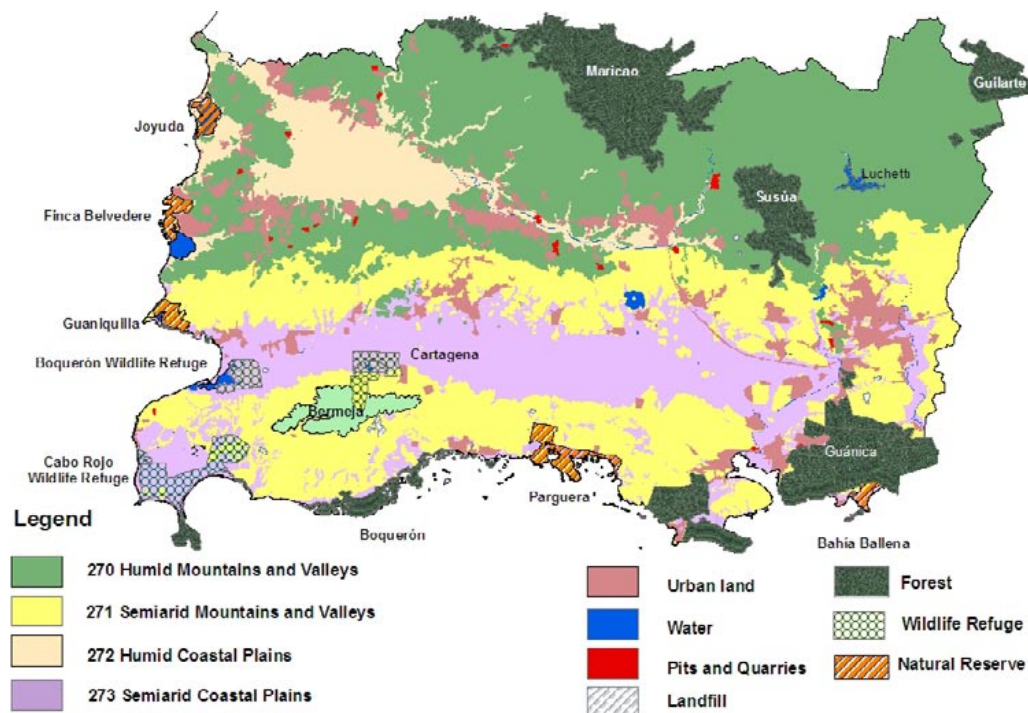


Figure 14.—Major land uses in the survey area.

Endangered and threatened species live in the survey area. In order to preserve and protect fragile ecosystems, about 50,000 acres of wildlife refuges, natural reserves, and forest are under custody of the Conservation Trust, federal government, and state government.

Major Land Resource Areas

Major Land Resource Areas (MLRAs) are geographically associated land resource units, usually encompassing several thousand acres, characterized by a particular pattern of soils, geology, climate, water resources, and land use. A unit can be one continuous area or several separate nearby areas. The MRLAs in the San Germán Soil Survey Area are MLRA 270, Humid Mountains and Valleys; MLRA 271, Semiarid Mountains and Valleys; MLRA 272, Humid Coastal Plains; and MLRA 273, Semiarid Coastal Plains.

Humid Mountains and Valleys (MLRA 270)

This MLRA encompass three ecological life zones: the Subtropical Moist Forest, Subtropical Wet Forest, and Subtropical Lower Mountain Wet Forest (fig. 15).

The **Subtropical Moist Forest** is characterized by a mean annual precipitation of about 1,000 to 2,200 millimeters and a biotemperature between 18° and 24° C (Ewel and Whitmore, 1973). Historically, most of this forest has suffered vast deforestation for agricultural uses, such as planting and managing citrus, bananas, plantains, improved forage grasses, livestock, coffee, and sugarcane. Many farms have been abandoned, and luxurious secondary forests are common.

Common plant species include native and naturalized forage grasses, such as *Megathyrsus maximus* (guinea grass or yerba guinea), *Cynodon nlemfuensis* (star

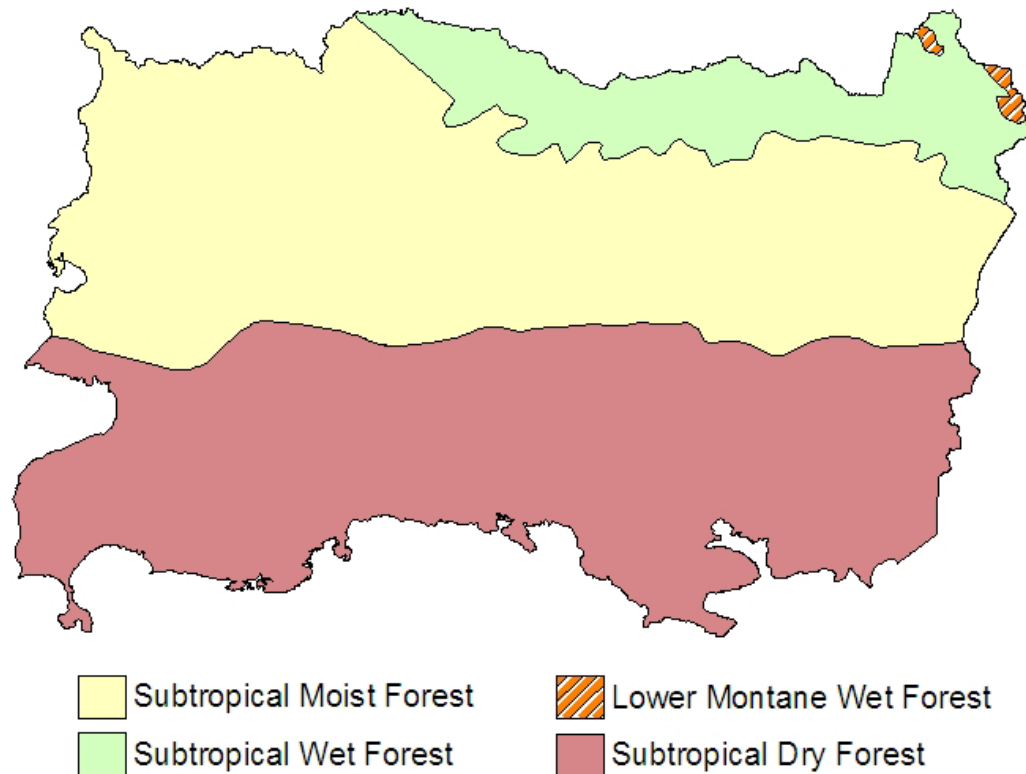


Figure 15.—Ecological life zones in the survey area.

grass or yerba estrella morada) (fig. 16), *C. plectostachyus* (star grass or yerba estrella blanca), *Axonopus compressus* (carpet grass or grama colorada), *Sporobolus indicus* (smut grass or cerrillo), *Pharus latifolius* (broadleaf stalkgrass or lamedora), *Paspalum paniculatum* (crown grass or yerba peluda), *Olyra latifolia* (olyra or carruzillo), *Paspalum virgatum* (matojo blanco), and *Paspalum millegrana* (crown grass or cortadera) (Más and García-Molinari, 2006).

Most of the common tree species that have been introduced to this life zone have edible characteristics or are ornamental. Although not all of the species are present in farmland, they have been maintained for cultural reasons. Species include *Artocarpus altilis* (breadfruit or panapén), *Mangifera indica* (mango), various species of citrus and *Delonix regia* (flame tree or flamboyán). *Roystonea borinquena* (Puerto Rican royal palm or palma real), an endemic species, and some natives, such as *Tabebuia heterophylla* (white cedar or roble blanco), commonly thrive in this life zone. Common introduced tree species include *Erythrina poeppigiana* (mountain immortal or bucayo gigante) and *Inga laurina* (sweet pea or guamá).

Farmland and disturbed areas of this forest are subject to invasive plant species, some of which are also present in the Dry Forest. Common invasive species include *Paspalum fasciculatum* (Mexican crown grass or yerba venezolana) (Más and García-Molinari, 2006), *Albizia lebbek* (thibet tree or acasia amarilla), *Albizia procera* (white siris or acasia blanca), *Mimosa pellita* (black mimosa or morivivi gigante), *Acacia farnesiana* (casha or aroma), and *Spathodea campanulata* (African tulip tree or tulipán africano). Grasses such as *P. fasciculatum* and *M. maximus* dominate most of the grassland.

The Subtropical Moist Forest also covers part of the coffee region. Shade coffee plantations provide shelter and food for wildlife. These plantations increase the



Figure 16.—A living fence made of *Gliricidia sepium* in a paddock of stargrass (*Cynodon nlemfuensis*) in the Subtropical Moist Forest.

content of organic matter in the soil, reduce the hazard of erosion, and increase water recharge. Common tree species recommended for shades include: *Inga vera* (guamá), *Gliricidia sepium* (quick stick or madre de cacao), and *Erythrina berteroana* (bucaré enano).

Susúa Forest, Luchetti Lake Wildlife Refuge, Maricao State Forest, and Monte Guilarte State Forest are within this MLRA. Endemic species in Susúa include *Otus nudipes* (Puerto Rican Screech-Owl or Múcaro Común), *Chlorostilbon maugaeus* (Puerto Rican emerald or zumbadorcito de Puerto Rico), *Todus mexicanus* (Puerto Rican Tody or San Pedrito de Puerto Rico), *Melanerpes portoricensis* (Puerto Rican woodpecker or carpintero de Puerto Rico), and *Myiarchus stolidus* (Puerto Rican flycatcher or juí de Puerto Rico).

Luchetti Lake was built in 1952 as a reservoir for irrigation water and to generate electricity. It is part of the Yauco Hydroelectric System. Some of the fish in the lake include *Lepomis Macrochirus* (fish bluegill or chopá criolla), *Lepomis microlophus* (redeer sunfish or chopá caracolera), *Ictalurus punctatus* (channel catfish or barbudo de canal), and *Tilapia randalli* (redbreast tilapia or tilapia moteada).

The **Subtropical Wet Forest** has high rainfall. The mean annual precipitation ranges from 2,000 to 4,000 millimeters per year (Ewel and Whitmore, 1973). The limited part of this life zone that is in the survey area is along the northern fringes of the survey area adjacent to mountain peaks.

The vegetation growth in the Subtropical Wet Forest is luxurious. Common species include *Cyathea arborea* (tree-fern or helecho gigante), *Dacryodes excelsa* (candlewood or tabonuco), *Sloanea berteriana* (motillo), and *Mailkara bidentata* (bulletwood or ausubo) (Ewel and Whitmore, 1973). Commonly planted crops include coffee, citrus, bananas, and root crops. Plant species in the Subtropical Wet Forest are similar to those in the Moist Forest, especially in areas of serpentine soils.

The Maricao State Forest is representative of the Subtropical Wet Forest. It provides habitat for avifauna similar to those in the Susúa Forest. It also provides habitat for *Dendroica angelae* (elfin woods warbler or Reinita del Bosque Enano).

The **Subtropical Lower Montane Wet Forest** is characterized by the elevation of the mountains (700 to 1,000 meters above sea level). It occupies a very small part of the survey area. Characteristic vegetation includes epiphytes and the palo colorado forest type named for the common swamp cyrilla (*Cyrilla racemifolia*) (fig. 17). Two additional associations are commonly found in this forest. The first is the cloud forest referred to as elfin woodland or dwarf forest. The second is the palm brake, which consists of nearly pure strands of *Prestoea Montana*.

Because of the high rainfall (2,580 millimeters), the Subtropical Lower Montane Wet Forest is too fragile for many commercial forestry or agriculture activities. Small sites are cropped or occasionally grazed. This zone is mainly used for conservation purposes. Other common uses are investigation, recreation, and wildlife habitat.

A small area of Monte Guilarte Forest is within the Humid Mountains and Valleys MLRA. Monte Guilarte is classified as Subtropical Lower Montane Wet Forest. The *Accipiter venator striatus* (sharp-shinned hawk or halcón de sierra), an endemic subspecies is now restricted to Maricao and Monte Guilarte Forest (Oberle, 2006). Some of the vegetation in the Monte Guilarte Forest includes *Prestoea montana* (sierra palm or palma de sierra), *Micropholis* sp. (caimitillo), *Sapium laurocerasum* (tabaiba), *Tabebuia schumanniana*, and *Ocotea spatulata*. There are also eucalyptus and capá prieto plantations.

Semiarid Mountains and Valleys (MLRA 271)

This MLRA includes the Subtropical Dry Forest and a small part of the Subtropical Moist Forest, which was described in the previous section. These two ecological zones share many species. Species can be found in different soils and ecotones, and their presence or absence is determined mostly by anthropogenic disturbances.



Figure 17.—Epiphytic vegetation common to the Subtropical Lower Montane Wet Forest.

The **Subtropical Dry Forest** is the driest and most extensive life zone in the survey area. Except for in areas of limestone rock outcrops and along coastal fringes, the composition of native vegetation in this zone has been subject to severe changes. Formerly, the changes were due to cutting for fuelwood. Currently, the changes are due to cropping and livestock enterprises.

Introduced and naturalized species are common, especially those with agricultural attributes related to raising cattle, sheep, goats, horses, and other livestock (fig. 18).

Currently, most of the flatlands in the zone are used for hay production and grazing. Some of the hills are used for the production of pineapple of the variety “piña cabezona” or for pasture or vegetable production. The mean annual rainfall ranges from 600 to 1,100 millimeters (Ewel and Whitmore, 1973). Hills maintain shrubby species and seasonal pasture. Native pastures consist of *Heteropogon contortus* (twisted grass or yerba torcida), *Bouteloua repens* (slender grama or lamilla), and *Stylosanthes hamata* (stylo) (Más and García-Molinari, 2006). Introduced species used for hay consist mainly of *Pennisetum ciliare* (buffel grass or yerba bofel) and *Digitaria eriantha* (pangola). Common species in naturalized pastures in the area include *Dichanthium annulatum* (Kleberg or Pajón), *Bothriochloa pertusa* (hurricane or huracán), and *Megathyrus maximus* syn. *Panicum maximum* (guinea grass).

Most upland trees and shrubs are introduced species of varying degrees of invasiveness. They provide some fodder or shelter for livestock or wildlife. Feral monkeys *Macaca mulatta* (rhesus macaques), *Erythrocebus patas* (patas monkeys), and *Iguana iguana* (bamboo chicken or gallina de palo) are introduced wildlife species. These species regularly cause severe damage to crops and wildlife habitat. Common introduced species of trees and shrubs include *Proposis juliflora* (mesquite or bayahonda), *Acacia farnesiana* (casha or aroma), *Albizia lebbek* (thibet tree or acacia



Figure 18.—Rolling hills used for pasture in the Subtropical Dry Forest.

amarilla), *Albizia procera* (white siris or acasia blanca), and *Leucaena leucocephala* (wild tamarind or zarzilla). Important native trees thriving in the area include *Bucida buceras* (black olive or úcar), *Guaiacum officinale* (lignumvitae or guayacán), and *Bursera simaruba* (turpentine or almácigo).

Permanent and seasonal wetlands share this ecosystem. Most of the fresh water wetland vegetation consists of *Paspalidium geminatum* (water panicum or yerba de pantano), *Thypha dominguensis* (southern cattail or enea), *Sesbania sesban* (sesbania or papagayo), *Eichhornia crassipes* (common water hyacinth or jacinto común de agua), *Polygonum punctatum* (smartweed or yerba de jicotea), and *Pistia stratiotes* (water lettuce or lechuga de agua). The characteristic vegetation in brackish and salt water wetlands consists of *Rhizophora mangle* (red mangrove or mangle rojo), *Avicennia germinans* (black mangrove or mangle negro), *Laguncularia racemosa* (white mangrove or mangle blanco), *Conocarpus erectus* (button mangrove or mangle de botón), *Bacopa monnieri* (coastal water-hyssop or yerba de culebra), and *Batis maritima* (saltwort or barilla). Few species thrive in the salt flats. They are represented by such species as *Sporobolus pyramidatus* (Madagascar dropseed or yerba de sal), *Heliotropium curassavicum* (salt heliotrope or cotorrera de playa), and *Sesuvium portulacastrum* (shoreline seapurslane or yerba de vidrio).

Mixed with the salt flats, wetlands, and uplands are extensive areas of rock outcrop and small pockets of soils that are shallow to the substratum, beach sands, and shallow soils. The vegetation in such areas is sparse and shorter than in other areas. Some species have xeromorphic characteristics. Species thriving in these conditions include *Aristida adscensionis* (sixweeks threeawn or aristida de Asunción), *Cenchrus tribuloides* (sandune sandbur or abrojo de playa), *Dactyloctenium aegyptium* (egyptian grass or yerba egipcia), *Spartina patens* (saltgrass or yerba de sal), *Sporobolus virginicus* (seashore dropseed or matojo de playa), and *Uniola virgata* (wire grass or

yerba de alambre). Among other common species include *Coccoloba uvifera* (sea grape or uva playera), *Bursera simaruba* (turpentine tree or almacigo), *Byrsonoma lucida* (candle berry or palo de doncella), *Cephalocereus royerii* (dildo cactus or sebucán), *Randia aculeata* (Christmas tree or escambrón), *Melocactus intortus* (turk's cap or melón de costa), and *Plumeria* sp. (alelí).

Guánica State Forest was designated a Global International Biosphere Reserve by UNESCO in 1981. The marine and coastal portions of the reserve include a large variety of habitats, including wetlands, such as mangrove; forests in estuarine areas; rocky and sandy beaches; coastal lagoons; seagrass beds; coral reefs; and colonized hardgrounds (fig. 19). Endangered species in this forest include *Leptocereus quadricostatus* (Pitahaya or catus de 4 lados), *Caprimulgus noctitherus* (Puerto Rican nightjar or guabairo pequeño de Puerto Rico), *Agelaius xanthomus* (yellow shoulder blackbird or mariquita), *Stahlia monosperma* (cobana negra), *Vernonia proctori* (no common name), *Aristida chaseae* (chase's threeawn), *Aristida portoricensis* (threeawn or pelos del diablo), and *Peltophryne lemur* (Puerto Rican crested toad or sapo concho).

Punta Guaniquilla Natural Reserve provides important habitat for various species, including pelicans, herons, and land crabs. It is composed of a complex of salt flats, mangrove forests, coastal lagoons, seagrass beds, sandy beaches, rocky coasts, coral reefs, and colonized hardgrounds.

Sierra Bermeja is a mountain range with the oldest geological formation in the Caribbean (Jurassic period). It is adjacent to Cartagena Lagoon. This mountain range provides habitat for many endemic and endangered species, including yellow-shouldered blackbird, Puerto Rican nightjar, *Lyonia truncata* var. *proctori*, *Stahlia monosperma*, *Vernonia proctori*, and *Aristida portoricensis*.



Figure 19.—An area of La Covana-Limestone outcrop-Seboruco complex, 12 to 40 percent slopes, in the Subtropical Dry Forest (Guánica). Vegetation consists mainly of dwarf shrubs and cacti.

Humid Coastal Plains (MLRA 272)

This MLRA shares flora and fauna communities with the Humid Mountains and Valleys (MLRA 270).

Joyuda Lagoon exhibits bioluminescent phenomena produced by the concentration of the small dinoflagellate *Pyrodinium bahamense* and *ctenophora*, (*Mnemiopsis* sp.). In addition, the lagoon provides habitat for many fish and invertebrate species, including shrimp that are fished by locals. The lagoon is bordered by an extensive mangrove forest, and a channel at the southwest point provides a connection to the sea. The mangrove, mostly red mangrove, provide habitat to such fish species as *Megalops atlanticus* (Sábalo), *Sphyraena barracuda* (Picúa), *Diapterus rhombeus* (Mojárreta), *Centropomus undecimalis* (Róbalo), *Eucinostomus melanopterus*, *Caranx latus* (Juriel Ojón), *Oligoplites saurus* (Cueriduro), *Gerres cinereus* (Muniama), *Mugil curema* (Area), and *Cetengraulis edentulus* (Bocha).

Belvedere Farm has lands of great ecological value due to the diversity of wildlife and the lands continuity with the Boquerón State Forest. The area includes seagrass beds, mangrove forests, coral reefs, and cays that have not been greatly altered and which receive and shelter a diversity of organisms. The endangered species *Eretmochelys imbricata* (hawksbill sea turtle or carey de concha) uses the beaches of this reserve to nest. Other protected species found in the reserve include *Trichechus manatus manatus* (antillean manatee or manatí), *Agelaius xanthomus* (yellow-shouldered blackbird or mariquita), *Pelecanus occidentalis* (brown pelican or pelicano pardo), and *Anolis cooki* (Cook's anole lizard or lagartijo de Cook).

Semiarid Coastal Plains (MLRA 273)

This MLRA has a distribution of plants and animals that corresponds to the Subtropical Dry Forest life zone.

Boquerón State Forest is divided into 12 segments: lands adjacent to Montalva Bay, Pitahaya forest, the Windmills, lands around the lighthouse, Boquerón, Puerto Real, Guaniquilla mangroves in the area of Villa Taína, mangroves of Villa La Mela, Miradero Ward (Punta Ostiones), Cayo Ratones, mangroves of the Joyuda Lagoon, and Guanajibo mangroves. Part of the forest is in the Semiarid Mountains and Valleys MLRA (271).

Cabo Rojo National Wildlife Refuge has forest, mangrove, and salt flats along the coast and sandy beaches near the lighthouse. Part of this refuge is in the Semiarid Mountains and Valleys MLRA (271).

Boquerón Wildlife Refuge was developed as habitat for migratory birds by the construction of dikes and the installation of pumps that permitted the creation of freshwater swamp areas. Hunting of certain species is allowed within the refuge during hunting season with the appropriate permits from the Puerto Rico Department of Natural and Environmental Resources.

Cartagena Lagoon has important freshwater habitats for migratory waterfowl and aquatic birds.

Bahía Ballena area is managed by the Conservation Trust of Puerto Rico and is part of the Guánica State Forest. It provides important habitat for wildlife, including endangered and threatened species such as sapo concho (*Peltophryne lemur*).

La Parguera contains extensive coral reefs, mangrove forests, salt flats, and seagrass beds and has two bioluminescent bays (La Parguera y la Bahía Monsio José). Part of this National Reserve is in the Semiarid Mountains and Valleys MLRA (271).

Species Listed for Conservation

The San Germán Soil Survey Area includes species listed for protection by Federal and state agencies. The regulation for threatened and endangered species of the

Commonwealth of Puerto Rico (Department of Natural and Environmental Resources; 2004; regulation number 6766) listed the species with their respective level of endangerment. The Department of Natural and Environmental Resources used five categories from the 1994 International Union for the Conservation of Nature Red List to classify priority species. The category definitions are:

Critically Endangered (CR): A critically endangered species faces an extremely high risk of extinction in the wild in the immediate future.

Endangered (EN): A species is endangered when it is not CR, but faces a very high risk of extinction in the wild in the near future.

Vulnerable (VU): A species is vulnerable when it is not CR or EN, but it faces a high risk of extinction in the wild in a foreseeable future.

Low Risk (LR): A species is at low risk when, after an evaluation, it did not satisfy any of the previous categories (i.e., CR, EN or VU), and it is not Data Deficiency.

Data Deficiency (DD): A species belongs to this category when there is not enough information for a direct or indirect assessment of its risk of extinction based on its distribution and/or population status.

For purposes of the description of this area, only the Critically Endangered (CR), Endangered (EN), and Vulnerable (VU) categories are considered. Table 10 summarizes the distribution by taxon, and table 11 summarizes the species listed and their respective State or Federal level of endangerment.

Recreational Development

In tables 12a and 12b, the soils of the survey area are rated according to limitations that affect their suitability for recreational development. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the recreational uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The ratings in the tables are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils that are subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

The information in these tables can be supplemented by other information in this survey, for example, interpretations for dwellings without basements, for local roads and streets, and for septic tank absorption fields.

Table 12a

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The ratings are based on the soil properties that affect the ease of developing camp areas and the performance of the areas after development. Slope, stoniness, and depth to bedrock or a cemented pan are the main concerns affecting the development of camp areas. The soil properties that affect the performance of the areas after development are those that influence trafficability and promote the growth of vegetation, especially in heavily used areas. For good trafficability, the surface of camp areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The ratings are based on the soil properties that affect the ease of developing picnic areas and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of picnic areas. For good trafficability, the surface of picnic areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Playgrounds require soils that are nearly level, are free of stones, and can withstand intensive foot traffic. The ratings are based on the soil properties that affect the ease of developing playgrounds and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of playgrounds. For good trafficability, the surface of the playgrounds should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Table 12b

Paths and trails for hiking and horseback riding should require little or no slope modification through cutting and filling. The ratings are based on the soil properties that affect trafficability and erodibility. These properties are stoniness, depth to a water table, ponding, flooding, slope, and texture of the surface layer.

Off-road motorcycle trails require little or no site preparation. They are not covered with surfacing material or vegetation. Considerable compaction of the soil material is likely. The ratings are based on the soil properties that influence erodibility, trafficability, dustiness, and the ease of revegetation. These properties are stoniness, slope, depth to a water table, ponding, flooding, and texture of the surface layer.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic

materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer. The suitability of the soil for traps, tees, roughs, and greens is not considered in the ratings.

Hydric Soils

Table 13 lists the map unit components that are rated as hydric soils in the survey area. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and Vasilas, 2006).

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for all of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The criteria for hydric soils are represented by codes in the table (for example, 2B3). Definitions for the codes are as follows:

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
 - A. are somewhat poorly drained and have a water table at the surface (0.0 feet) during the growing season, or
 - B. are poorly drained or very poorly drained and have either:
 - 1) a water table at the surface (0.0 feet) during the growing season if textures are coarse sand, sand, or fine sand in all layers within a depth of 20 inches, or
 - 2) a water table at a depth of 0.5 foot or less during the growing season if permeability is equal to or greater than 6.0 in/hr in all layers within a depth of 20 inches, or
 - 3) a water table at a depth of 1.0 foot or less during the growing season if permeability is less than 6.0 in/hr in any layer within a depth of 20 inches.
3. Soils that are frequently ponded for long or very long duration during the growing season.
4. Soils that are frequently flooded for long or very long duration during the growing season.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the data in the tables described under the heading "Soil Properties."

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about particle-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 7 feet of the surface, soil wetness, depth to a water table, ponding, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills,

septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, reclamation material, roadfill, and topsoil; plan structures for water management; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. Tables 14a and 14b show the degree and kind of soil limitations that affect dwellings with and without basements, small commercial buildings, local roads and streets, shallow excavations, and lawns and landscaping.

The ratings in the tables are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Table 14a

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that

affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Table 14b

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer.

Sanitary Facilities

Tables 15a and 15b show the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, sanitary landfills, and daily cover for landfill. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Table 15a

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 60 inches is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may become contaminated.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, flooding, large stones, and content of organic matter.

Soil permeability is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is severe. Soils that have a permeability rate of more than 2 inches per hour are too porous for the proper functioning of sewage lagoons. In these soils, seepage of the effluent can result in contamination of the ground water. Ground-water contamination is also a hazard if fractured bedrock is within a depth of 40 inches, if the water table is high enough to raise the level of sewage in the lagoon, or if floodwater overtops the lagoon.

A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor. If the lagoon is to be uniformly deep throughout, the slope must be gentle enough and the soil material must be thick enough over bedrock or a cemented pan to make land smoothing practical.

Table 15b

A trench sanitary landfill is an area where solid waste is placed in successive layers in an excavated trench. The waste is spread, compacted, and covered daily with a thin layer of soil excavated at the site. When the trench is full, a final cover of soil material at least 2 feet thick is placed over the landfill. The ratings in the table are based on the soil properties that affect the risk of pollution, the ease of excavation, trafficability, and revegetation. These properties include permeability, depth to bedrock or a cemented pan, depth to a water table, ponding, slope, flooding, texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, onsite investigation may be needed.

Hard, nonrippable bedrock, creviced bedrock, or highly permeable strata in or directly below the proposed trench bottom can affect the ease of excavation and the hazard of ground-water pollution. Slope affects construction of the trenches and the movement of surface water around the landfill. It also affects the construction and performance of roads in areas of the landfill.

Soil texture and consistence affect the ease with which the trench is dug and the ease with which the soil can be used as daily or final cover. They determine the

workability of the soil when dry and when wet. Soils that are plastic and sticky when wet are difficult to excavate, grade, or compact and are difficult to place as a uniformly thick cover over a layer of refuse.

The soil material used as the final cover for a trench landfill should be suitable for plants. It should not have excess sodium or salts and should not be too acid. The surface layer generally has the best workability, the highest content of organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

In an *area sanitary landfill*, solid waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site. A final cover of soil material at least 2 feet thick is placed over the completed landfill. The ratings in the table are based on the soil properties that affect trafficability and the risk of pollution. These properties include flooding, permeability, depth to a water table, ponding, slope, and depth to bedrock or a cemented pan.

Flooding is a serious problem because it can result in pollution in areas downstream from the landfill. If permeability is too rapid or if fractured bedrock, a fractured cemented pan, or the water table is close to the surface, the leachate can contaminate the water supply. Slope is a consideration because of the extra grading required to maintain roads in the steeper areas of the landfill. Also, leachate may flow along the surface of the soils in the steeper areas and cause difficult seepage problems.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste. The ratings in the table also apply to the final cover for a landfill. They are based on the soil properties that affect workability, the ease of digging, and the ease of moving and spreading the material over the refuse daily during wet and dry periods. These properties include soil texture, depth to a water table, ponding, rock fragments, slope, depth to bedrock or a cemented pan, reaction, and content of salts, sodium, or lime.

Loamy or silty soils that are free of large stones and excess gravel are the best cover for a landfill. Clayey soils may be sticky and difficult to spread; sandy soils are subject to wind erosion.

Slope affects the ease of excavation and of moving the cover material. Also, it can influence runoff, erosion, and reclamation of the borrow area.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. It should not have excess sodium, salts, or lime and should not be too acid.

Construction Materials

Tables 16a and 16b give information about the soils as potential sources of gravel, sand, reclamation material, roadfill, and topsoil. Normal compaction, minor processing, and other standard construction practices are assumed.

Table 16a

Gravel and *sand* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In the table, only the likelihood of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material. The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the Unified classification of the soil), the thickness of suitable material, and the content of rock fragments. If the bottom layer of the soil contains gravel or

sand, the soil is considered a likely source regardless of thickness. The assumption is that the gravel or sand layer below the depth of observation exceeds the minimum thickness.

The soils are rated *good*, *fair*, or *poor* as potential sources of gravel and sand. A rating of *good* or *fair* means that the source material is likely to be in or below the soil. The bottom layer and the thickest layer of the soils are assigned numerical ratings. These ratings indicate the likelihood that the layer is a source of gravel or sand. The number 0.00 indicates that the layer is a poor source. The number 1.00 indicates that the layer is a good source. A number between 0.00 and 1.00 indicates the degree to which the layer is a likely source.

Table 16b

In table 16b, the rating class terms are *good*, *fair*, and *poor*. The features that limit the soils as sources of these materials are specified in the tables. The numerical ratings given after the specified features indicate the degree to which the features limit the soils as sources of reclamation material, roadfill, and topsoil. The lower the number, the greater the limitation.

Reclamation material is used in areas that have been drastically disturbed by surface mining or similar activities. When these areas are reclaimed, layers of soil material or unconsolidated geological material, or both, are replaced in a vertical sequence. The reconstructed soil favors plant growth. The ratings in the table do not apply to quarries and other mined areas that require an offsite source of reconstruction material. The ratings are based on the soil properties that affect erosion and stability of the surface and the productive potential of the reconstructed soil. These properties include the content of sodium, salts, and calcium carbonate; reaction; available water capacity; erodibility; texture; content of rock fragments; and content of organic matter and other features that affect fertility.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the whole soil, from the surface to a depth of about 5 feet. It is assumed that soil layers will be mixed when the soil material is excavated and spread.

The ratings are based on the amount of suitable material and on soil properties that affect the ease of excavation and the performance of the material after it is in place. The thickness of the suitable material is a major consideration. The ease of excavation is affected by large stones, depth to a water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the AASHTO classification of the soil) and linear extensibility (shrink-swell potential).

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area. The ratings are based on the soil properties that affect plant growth; the ease of excavating, loading, and spreading the material; and reclamation of the borrow area. Toxic substances, soil reaction, and the properties that are inferred from soil texture, such as available water capacity and fertility, affect plant growth. The ease of excavating, loading, and spreading is affected by rock fragments, slope, depth to a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, depth to a water table, rock fragments, depth to bedrock or a cemented pan, and toxic material.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 17 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. Embankments that have zoned construction (core and shell) are not considered. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Agricultural Waste Management

Soil properties are important considerations in areas where soils are used as sites for the treatment and disposal of organic waste and wastewater. Selection of soils with properties that favor waste management can help to prevent environmental damage.

Tables 18a, 18b, and 18c show the degree and kind of soil limitations affecting the treatment of agricultural waste, including municipal and food-processing wastewater and effluent from lagoons or storage ponds. Municipal wastewater is the waste stream from a municipality. It contains domestic waste and may contain industrial waste. It may have received primary or secondary treatment. It is rarely untreated sewage. Food-processing wastewater results from the preparation of fruits, vegetables, milk, cheese, and meats for public consumption. In places it is high in content of sodium and chloride. In the context of these tables, the effluent in lagoons and storage ponds is from facilities used to treat or store food-processing wastewater or domestic or animal waste. Domestic and food-processing wastewater is very dilute, and the effluent from the facilities that treat or store it commonly is very low in content of carbonaceous and nitrogenous material; the content of nitrogen commonly ranges from 10 to 30 milligrams per liter. The wastewater from animal waste treatment lagoons or storage ponds, however, has much higher concentrations of these materials, mainly because the manure has not been diluted as much as the domestic waste. The content of nitrogen in this wastewater generally ranges from 50 to 2,000 milligrams per liter. When wastewater is applied, checks should be made to ensure that nitrogen, heavy metals, and salts are not added in excessive amounts.

The ratings in the tables are for waste management systems that not only dispose of and treat organic waste or wastewater but also are beneficial to crops (application of manure and food-processing waste, application of sewage sludge, and disposal of wastewater by irrigation) and for waste management systems that are designed only for the purpose of wastewater disposal and treatment (overland flow of wastewater, rapid infiltration of wastewater, and slow rate treatment of wastewater).

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect agricultural waste management. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Table 18a

Application of manure and food-processing waste not only disposes of waste material but also can improve crop production by increasing the supply of nutrients in the soils where the material is applied. Manure is the excrement of livestock and poultry, and food-processing waste is damaged fruit and vegetables and the peelings, stems, leaves, pits, and soil particles removed in food preparation. The manure and food-processing waste are either solid, slurry, or liquid. Their nitrogen content varies. A high content of nitrogen limits the application rate. Toxic or otherwise dangerous wastes, such as those mixed with the lye used in food processing, are not considered in the ratings.

The ratings are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the waste is applied, and the method by which the waste is applied. The properties that affect absorption include permeability, depth to a water table, ponding, the sodium adsorption ratio, depth to bedrock or a cemented pan, and available water capacity. The properties that affect plant growth

and microbial activity include reaction, the sodium adsorption ratio, salinity, and bulk density. The wind erodibility group, the soil erodibility factor K, and slope are considered in estimating the likelihood that wind erosion or water erosion will transport the waste material from the application site. Stones, cobbles, a water table, ponding, and flooding can hinder the application of waste.

Application of sewage sludge not only disposes of waste material but also can improve crop production by increasing the supply of nutrients in the soils where the material is applied. In the context of this table, sewage sludge is the residual product of the treatment of municipal sewage. The solid component consists mainly of cell mass, primarily bacteria cells that developed during secondary treatment and have incorporated soluble organics into their own bodies. The sludge has small amounts of sand, silt, and other solid debris. The content of nitrogen varies. Some sludge has constituents that are toxic to plants or hazardous to the food chain, such as heavy metals and exotic organic compounds, and should be analyzed chemically prior to use.

The content of water in the sludge ranges from about 98 percent to less than 40 percent. The sludge is considered liquid if it is more than about 90 percent water, slurry if it is about 50 to 90 percent water, and solid if it is less than about 50 percent water.

The ratings in the table are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the sludge is applied, and the method by which the sludge is applied. The properties that affect absorption, plant growth, and microbial activity include permeability, depth to a water table, ponding, the sodium adsorption ratio, depth to bedrock or a cemented pan, available water capacity, reaction, salinity, and bulk density. The wind erodibility group, the soil erodibility factor K, and slope are considered in estimating the likelihood that wind erosion or water erosion will transport the waste material from the application site. Stones, cobbles, a water table, ponding, and flooding can hinder the application of sludge.

Table 18b

Disposal of wastewater by irrigation not only disposes of municipal wastewater and wastewater from food-processing plants, lagoons, and storage ponds but also can improve crop production by increasing the amount of water available to crops. The ratings in the table are based on the soil properties that affect the design, construction, management, and performance of the irrigation system. The properties that affect design and management include the sodium adsorption ratio, depth to a water table, ponding, available water capacity, permeability, slope, and flooding. The properties that affect construction include stones, cobbles, depth to bedrock or a cemented pan, depth to a water table, and ponding. The properties that affect performance include depth to bedrock or a cemented pan, bulk density, the sodium adsorption ratio, salinity, reaction, and the cation-exchange capacity, which is used to estimate the capacity of a soil to adsorb heavy metals.

Overland flow of wastewater is a process in which wastewater is applied to the upper reaches of sloped land and allowed to flow across vegetated surfaces, sometimes called terraces, to runoff-collection ditches. The length of the run generally is 150 to 300 feet. The application rate ranges from 2.5 to 16.0 inches per week. It commonly exceeds the rate needed for irrigation of cropland. The wastewater leaves solids and nutrients on the vegetated surfaces as it flows downslope in a thin film. Most of the water reaches the collection ditch, some is lost through evapotranspiration, and a small amount may percolate to the ground water.

The ratings in the table are based on the soil properties that affect absorption, plant growth, microbial activity, and the design and construction of the system. Reaction and the cation-exchange capacity affect absorption. Reaction, salinity, and the sodium adsorption ratio affect plant growth and microbial activity. Slope, permeability, depth to a water table, ponding, flooding, depth to bedrock or a cemented pan, stones, and cobbles affect design and construction.

Table 18c

Rapid infiltration of wastewater is a process in which wastewater applied in a level basin at a rate of 4 to 120 inches per week percolates through the soil. The wastewater may eventually reach the ground water. The application rate commonly exceeds the rate needed for irrigation of cropland. Vegetation is not a necessary part of the treatment; hence, the basins may or may not be vegetated. The thickness of the soil material needed for proper treatment of the wastewater is more than 72 inches. As a result, geologic and hydrologic investigation is needed to ensure proper design and performance and to determine the risk of ground-water pollution.

The ratings in the table are based on the soil properties that affect the risk of pollution and the design, construction, and performance of the system. Depth to a water table, ponding, flooding, and depth to bedrock or a cemented pan affect the risk of pollution and the design and construction of the system. Slope, stones, and cobbles also affect design and construction. Permeability and reaction affect performance.

Slow rate treatment of wastewater is a process in which wastewater is applied to land at a rate normally between 0.5 inch and 4.0 inches per week. The application rate commonly exceeds the rate needed for irrigation of cropland. The applied wastewater is treated as it moves through the soil. Much of the treated water may percolate to the ground water, and some enters the atmosphere through evapotranspiration. The applied water generally is not allowed to run off the surface. Waterlogging is prevented either through control of the application rate or through the use of tile drains, or both.

The ratings in the table are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, and the application of waste. The properties that affect absorption include the sodium adsorption ratio, depth to a water table, ponding, available water capacity, permeability, depth to bedrock or a cemented pan, reaction, the cation-exchange capacity, and slope. Reaction, the sodium adsorption ratio, salinity, and bulk density affect plant growth and microbial activity. The wind erodibility group, the soil erodibility factor K, and slope are considered in estimating the likelihood of wind erosion or water erosion. Stones, cobbles, a water table, ponding, and flooding can hinder the application of waste.

Large Animal Disposal

Table 19 evaluates the soils as sites for disposing of dead animals by placing the carcasses in successive layers in an excavated pit or trench. The carcasses are spread, compacted, and covered daily with a thin layer of soil that is excavated from the pit or trench. When the pit or trench is full, a final cover of soil material at least 2 feet thick is placed over the burial pit or trench.

The interpretation is applicable to both heavily populated and sparsely populated areas. While some general observations may be made, onsite evaluation is required before the final site is selected. Improper site selection, design, or installation may cause contamination of ground water, seepage, and contamination of stream systems from surface drainage or floodwater. The risk of contamination can be reduced or eliminated by installing systems designed to eliminate or reduce the adverse effects of limiting soil properties. Ratings are for soils in their present condition. The present land use is not considered in the ratings.

Ratings are based on properties and qualities to the depth normally observed during soil mapping (approximately 6 or 7 feet). Because pits and trenches may be as deep as 15 feet or more, however, geologic investigations are needed to determine the potential for pollution of ground water and to determine the design needed. These investigations, which are generally arranged by the pit developer, include examination of stratification, rock formations, and geologic conditions that might lead to the conducting of leachates to aquifers, wells, watercourses, and other water sources. The presence of hard, nonrippable bedrock, bedrock crevices, or highly permeable strata

at or directly below the proposed pit bottom is undesirable because of the difficulty in excavation and the potential pollution of underground water.

Properties that influence the risk of pollution, ease of excavation, trafficability, and revegetation are major considerations. Soils that are flooded or have a water table within the depth of excavation present a potential pollution hazard and are difficult to excavate. Slope is an important consideration because it affects the work involved in road construction, the performance of the roads, and the control of surface water around the pit or trench. It may also cause difficulty in constructing pits or trenches in which the bottom of the pit or trench must be kept level and oriented to follow the contour of the land.

The ease with which the pit or trench is dug and with which a soil can be used as daily and final cover is based largely on soil texture and consistence, which determine workability when the soil is dry and when it is wet. Soils that are plastic and sticky when wet are difficult to excavate, grade, or compact and difficult to place as a uniformly thick cover over a layer of carcasses. The uppermost part of the final cover should be soil material that favors the growth of plants. It should not contain excess sodium or salts and should not be too acid. In comparison with other horizons, the surface layer in most soils has the best workability and the highest content of organic matter. Thus, it may be desirable to stockpile the surface layer for use in the final blanketing of the fill.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected of a properly designed and installed system. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings indicate the severity of the individual limitations. The ratings are shown in decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Soil Properties

Data relating to soil properties are collected during the course of the soil survey.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine particle-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties are shown in tables. They include engineering index properties, physical and chemical properties, and pertinent soil and water features.

Engineering Soil Properties

Table 20 gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement,

the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in the table "Engineering Index Test Data."

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and plasticity index (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

Physical Soil Properties

Table 21 shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In the table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (oven-dry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $1/3$ - or $1/10$ -bar (33- or 10-kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of in micrometers per second. They are based on soil characteristics observed in the field,

particularly structure, porosity, and texture. Saturated hydraulic conductivity (K_{sat}) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at $1/3$ - or $1/10$ -bar (33- or 10-kPa) moisture tension and oven dryness. The volume change is reported in the table as percent change for the whole soil. Volume change is influenced by the amount and type of clay minerals in the soil.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In the table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (K_w and K_f) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and permeability. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor K_w indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor K_f indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook," which is available in local offices of the Natural Resources Conservation Service or on the Internet.

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Chemical Soil Properties

Table 22 shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Cation-exchange capacity is the total amount of extractable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Effective cation-exchange capacity refers to the sum of extractable cations plus aluminum expressed in terms of milliequivalents per 100 grams of soil. It is determined for soils that have pH of less than 5.5.

Soil reaction is a measure of acidity or alkalinity. The pH of each soil horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Calcium carbonate equivalent is the percent of carbonates, by weight, in the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients is influenced by the amount of carbonates in the soil.

Gypsum is expressed as a percent, by weight, of hydrated calcium sulfates in the fraction of the soil less than 20 millimeters in size. Gypsum is partially soluble in water. Soils that have a high content of gypsum may collapse if the gypsum is removed by percolating water.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Sodium adsorption ratio (SAR) is a measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration. Soils that have SAR values of 13 or more may be characterized by an increased dispersion of organic matter and clay particles, reduced permeability and aeration, and a general degradation of soil structure.

Soil Features

Table 23 gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness and thickness of the restrictive layer, both of which significantly affect the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence generally results from either desiccation and shrinkage or

oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. The table shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Water Features

Table 24 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Surface runoff refers to the loss of water from an area by flow over the land surface. Surface runoff classes are based on slope, climate, and vegetative cover. It is assumed that the surface of the soil is bare and that the retention of surface

water resulting from irregularities in the ground surface is minimal. The classes are negligible, very low, low, medium, high, and very high.

The *months* in the table indicate the portion of the year in which the feature is most likely to be a concern.

Water table refers to a saturated zone in the soil. The table indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. The table indicates *surface water depth* and the *duration* and *frequency* of ponding. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. *None* means that ponding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of ponding is more than 50 percent in any year).

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

Physical and Chemical Analyses of Selected Soils

The results of analyses of several typical pedons in the survey area are available online at <http://ssldata.nrcs.usda.gov>. The pedons are listed in table 25. The data are for soils sampled at carefully selected sites. Unless otherwise indicated, the pedons are typical of the series. They are described in the section “Soil Series and Their Morphology.” Soil samples were analyzed by the National Soil Survey Laboratory of the Natural Resources Conservation Service at the National Soil Survey Center, Lincoln, Nebraska.

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Most determinations, except those for grain-size analysis and bulk density, were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an oven-dry basis. The methods used in obtaining the data are published in Soil Survey Investigations Report 42 (USDA, 1996 and 2004).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (Soil Survey Staff, 1999 and 2006). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 26 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Twelve soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Humult (*Hum*, meaning a content of organic carbon of 12 kilograms per square meter or more between the surface of the mineral soil and a depth of 100 centimeters, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplohumults (*Haplo*, meaning minimal horizonation, plus *humult*, the suborder of the Ultisols that has a content of organic carbon of 12 kilograms per square meter or more between the surface of the mineral soil and a depth of 100 centimeters).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Haplohumults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineralogy class, cation-exchange activity class, soil temperature regime, soil depth, and reaction class. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is very-fine, mixed, subactive, isothermic Typic Haplohumults.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. An example is the Agüeybaná series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the “Soil Survey Manual” (Soil Survey Division Staff, 1993) and in the “Field Book for Describing and Sampling Soils” (Schoeneberger and others, 2002). Many of the technical terms used in the descriptions are defined in “Soil Taxonomy” (Soil Survey Staff, 1999) and in “Keys to Soil Taxonomy” (Soil Survey Staff, 2006). Unless otherwise indicated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

In some instances, the typical pedon for a series is located outside the survey area. The selection of a typical pedon is based on the range of characteristics of the series as it occurs throughout a particular major land resource area. The Coamo series, for example, is common in MLRA 271 (Semiarid Mountains and Valleys), which extends from west to east from the municipality of Cabo Rojo to the municipality of Arroyo. The typical pedon for the Coamo series is in Salinas Municipality, Puerto Rico.

Agüeybaná Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderate

Parent material: Residuum that weathered from basalt

Landscape: Mountain ranges

Landform: Ridges and mountain slopes

Commonly associated soils: Chiquito, Cuchillas, Maricao, and Rubias soils

Slope: 12 to 60 percent

Taxonomic class: Very-fine, mixed, subactive, isothermic Typic Haplohumults

Typical Pedon

Agüeybaná clay, 20 to 60 percent slopes; about 3.0 miles southeast from downtown Castañer; 2.7 miles northeast of the intersection of Puerto Rico Highways 372 and 374; about 1.2 miles northeast of Concepción Farm; about 25 feet west of a paved road in a coffee plantation; Yauco Municipality; USGS Monte Guilarte topographic quadrangle (1960); lat. 18 degrees 8 minutes 43 seconds N. and long. 66 degrees 48 minutes 35 seconds W.

Ap—0 to 5 inches; strong brown (7.5YR 4/6) clay; moderate medium subangular blocky structure; slightly hard, firm, sticky, plastic; common fine and medium and few coarse roots; common fine and medium tubular pores; about 10 percent, by volume, pebbles; very strongly acid; clear smooth boundary.

A—5 to 14 inches; strong brown (7.5YR 4/6) clay; moderate fine and medium subangular blocky structure; slightly hard, friable, sticky, plastic; common fine and medium roots; common fine and medium tubular pores; about 5 percent, by volume, pebbles; strongly acid; clear wavy boundary.

Bt1—14 to 21 inches; red (2.5YR 4/6) clay; moderate fine and medium angular blocky structure parting to subangular blocky; slightly hard, firm, sticky, plastic; few fine and medium roots; common fine and medium tubular pores; common distinct clay films on faces of peds; about 5 percent, by volume, pebbles; strongly acid; clear smooth boundary.

Bt2—21 to 33 inches; red (2.5YR 4/8) clay; strong medium angular blocky structure; hard, firm, sticky, plastic; few fine and medium roots; many fine and medium

tubular pores; many prominent clay films on faces of peds; about 5 percent, by volume, pebbles; strongly acid; clear smooth boundary.

Bt3—33 to 44 inches; red (2.5YR 4/8) clay; moderate fine and medium angular blocky structure; hard, firm, sticky, plastic; few fine and medium roots; common fine and medium tubular pores; common distinct clay films on faces of peds; about 5 percent, by volume, pebbles; strongly acid; abrupt wavy boundary.

Bt4—44 to 57 inches; red (2.5YR 4/6) silty clay; moderate fine and medium subangular blocky structure; slightly hard, firm, slightly sticky, slightly plastic; few fine and medium tubular pores; common distinct clay films on faces of peds; about 10 percent, by volume, pebbles; strongly acid; abrupt irregular boundary.

C—57 to 80 inches; 20 percent red (2.5YR 4/6), 20 percent reddish brown (2.5YR 4/4), 20 percent yellowish red (5YR 5/6), 20 percent yellow (10YR 7/6), and 20 percent dark brown (10YR 3/3) clay loam; massive; soft, friable, slightly sticky, slightly plastic; few fine and medium interstitial pores; about 20 percent, by volume, pebbles; colors are indicative of parent material and are not redoximorphic features; strongly acid.

Range in Characteristics

Thickness of the solum: 41 to more than 80 inches

Content (by volume) and size of rock fragments: 0 to 10 percent pebbles in the A and Bt horizons and 5 to 25 percent in the C horizon

Reaction: Very strongly acid or strongly acid throughout

A and Ap horizons:

Color—hue of 2.5YR to 7.5YR, value of 4, and chroma of 3 to 8

Texture—clay loam or clay

Bt horizon:

Color—hue of 10R to 5YR, value of 4, and chroma of 4 to 8

Texture—clay loam, silty clay, or clay

BC horizon (where present):

Color—hue of 10R or 2.5YR, value of 4 or 5, and chroma of 6 to 8

Texture—silty clay loam, clay loam, silty clay, or clay

C horizon:

Color—no dominant color; multicolored in shades of red, brown, and yellow

Texture—clay loam or clay

Aguilita Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderate

Parent material: Colluvium and residuum that weathered from soft limestone bedrock

Landscape: Hills and uplands

Landform: Ridges and hillslopes

Commonly associated soils: Descalabrado, Duey, Fraternidad, Jácana, Pozo Blanco, and San Germán soils

Slope: 5 to 60 percent

Taxonomic class: Coarse-loamy, carbonatic, isohyperthermic Aridic Calciustolls

Typical Pedon

Aguilita silty clay loam, 5 to 20 percent slopes (fig. 20); about 1.9 miles southeast from the intersection of Puerto Rico Highways 367 and 368; about 2,000 feet northwest from the community of Arenas; about 600 feet southwest from a dirt road,



Figure 20.—Profile of Aguilita silty clay loam, 5 to 20 percent slopes. Aguilita soils are characterized by surface and subsurface layers of silty clay loam that have soft masses of secondary calcium carbonate. They are in the ustic soil moisture regime.

in naturalized pastureland; Guánica Municipality; USGS Sabana Grande topographic quadrangle (1966); lat. 18 degrees 1 minute 34 seconds N. and long. 66 degrees 54 minutes 56 seconds W.

- Ap—0 to 6 inches; brown (10YR 4/3) silty clay loam; weak very fine and fine subangular blocky structure; slightly hard, firm, slightly sticky, moderately plastic; common very fine and fine roots; common fine irregular and few fine vesicular pores; about 5 percent, by volume, pebbles; strongly effervescent; slightly alkaline; clear wavy boundary.
- Bk1—6 to 18 inches; brown (10YR 4/3) silty clay loam; moderate very fine and fine subangular blocky structure; slightly hard, firm, slightly sticky, moderately plastic; few very fine and fine roots; few very fine and fine irregular and few very fine vesicular pores; about 5 percent, by volume, pebbles; few very fine distinct light gray (10YR 7/2) irregular soft masses of calcium carbonate concentrations; common distinct pressure faces on peds; violently effervescent; moderately alkaline; clear wavy boundary.
- Bk2—18 to 23 inches; brown (10YR 5/3) clay loam; strong very fine and fine subangular blocky structure; hard, firm, slightly sticky, moderately plastic; few very fine and fine roots; common very fine and fine irregular pores; about 5 percent, by volume, pebbles; common fine distinct light gray (10YR 7/2) irregular soft masses of calcium carbonate concentrations; common distinct pressure faces on peds; violently effervescent; moderately alkaline; abrupt smooth boundary.
- C1—23 to 32 inches; pale brown (10YR 6/3) loam; massive; soft, very friable, moderately sticky, slightly plastic; few very fine and fine roots; few very fine irregular and few very fine vesicular pores; about 5 percent, by volume, pebbles; common fine distinct white (10YR 8/1) irregular soft masses of calcium carbonate concentrations; few fine secondary calcium carbonate concretions; violently effervescent; moderately alkaline; diffuse smooth boundary.
- C2—32 to 60 inches; pale brown (10YR 6/3) loam; massive; soft, very friable, moderately sticky, slightly plastic; few very fine and fine roots; common fine vesicular and few fine tubular pores; about 5 percent, by volume, pebbles; many fine and medium distinct white (10YR 8/1) irregular soft masses of calcium carbonate concentrations; common fine secondary calcium carbonate concretions; violently effervescent; moderately alkaline.

Range in Characteristics

Thickness of the solum: 10 to 32 inches

Content (by volume) and size of rock fragments: Less than 25 percent pebbles throughout

Reaction: Slightly alkaline or moderately alkaline throughout

A or Ap horizon:

Color—hue of 10YR, value of 3 or 4, and chroma of 1 to 3

Texture—silty clay loam or clay loam

AB horizon (where present):

Color—hue of 10YR, value of 4, and chroma of 3

Texture—silty clay loam

Bk horizon:

Color—hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 3 to 6

Texture—clay loam or silty clay loam

Calcium carbonate—common or many soft masses of concentrations, filaments, or threads

C horizon:

Color—hue of 10YR to 5Y, value of 5 to 8, and chroma of 1 to 6

Texture—loam or clay loam

Calcium carbonate—common or many soft masses of concentrations, filaments, or threads

Cr horizon (where present):

Color—hue of 10YR to 5Y, value of 5 to 8, and chroma of 1 to 6

Type of bedrock—soft limestone that can be excavated with difficulty using hand tools and is rippable by mechanical equipment

Aguirre Series

Depth class: Very deep

Drainage class: Poorly drained

Permeability: Very slow

Parent material: Clayey marine sediments and material derived from limestone and igneous rock

Landscape: Basins

Landform: Basin floors and depressions

Commonly associated soils: Cartagena, Fé, Fraternidad, Guánica, and Santa Isabel soils

Slope: 0 to 1 percent

Taxonomic class: Very-fine, smectitic, isohyperthermic Sodic Haplusterts

Typical Pedon

Aguirre clay, occasionally ponded; 3.5 miles southeast of the city of Lajas from the intersection of Puerto Rico Highways 116 and 117; about 200 feet east of a dirt road, in pasture; Lajas Municipality; USGS San Germán topographic quadrangle (1966); lat. 18 degrees 0 minutes 33 seconds N. and long. 67 degrees 0 minutes 56 seconds W.

Ap—0 to 10 inches; very dark gray (N 3/0) clay; moderate fine granular structure; hard, very firm, very sticky, very plastic; common fine roots; slightly effervescent; moderately alkaline; gradual wavy boundary.

A—10 to 18 inches; very dark gray (N 3/0) clay; moderate fine angular blocky structure; very hard, very firm, very sticky, very plastic; few fine roots on faces of peds; common pressure faces on surfaces of peds; slightly effervescent; moderately alkaline; abrupt wavy boundary.

Bss1—18 to 26 inches; dark gray (5Y 4/1) clay; moderate medium and coarse angular blocky structure; very hard, very firm, very sticky, very plastic; few fine roots on faces of peds and slickensides; many large slickensides having distinct polished and grooved surfaces; about 3 percent, by volume, igneous rock fragments; few black (10YR 2/1) concretions of iron-manganese; strongly effervescent; moderately alkaline; clear irregular boundary.

Bss2—26 to 36 inches; 50 percent light olive brown (2.5Y 5/4) and 50 percent dark gray (5Y 4/1) clay; moderate medium and coarse angular blocky structure; very hard, very firm, very sticky, very plastic; common large slickensides having prominent polished and grooved surfaces; few fine black (10YR 2/1) concretions of iron-manganese; slightly effervescent; moderately alkaline; clear irregular boundary.

Bss3—36 to 45 inches; olive gray (5Y 5/2) clay; moderate medium and coarse angular blocky structure; very hard, very firm, very sticky, very plastic; common large slickensides having prominent polished and grooved surfaces; few black (10YR 2/1) concretions of iron-manganese; slightly effervescent; moderately alkaline; gradual wavy boundary.

Bss4—45 to 80 inches; light olive brown (2.5Y 5/4) clay; moderate medium and coarse angular blocky structure; very hard, very firm, very sticky, very plastic; few fine

and medium slickensides having distinct polished and grooved surfaces; few black (10YR 2/1) concretions of iron-manganese; slightly effervescent; moderately alkaline.

Range in Characteristics

Thickness of the solum: More than 60 inches

Content (by volume) and size of rock fragments: 0 to less than 5 percent pebbles throughout

Reaction: Slightly alkaline or moderately alkaline in the A and Ap horizons and moderately alkaline in the Bss horizon

A and Ap horizons:

Color—hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 1 or 2; or neutral in hue and value of 3 or 4

Texture—clay

Bss horizon (upper part):

Color—hue of 10YR to 5Y, value of 4, and chroma of 1 or 2

Texture—clay

Bss horizon (lower part):

Color—hue of 10YR to 5Y, value of 3 to 5, and chroma of 2 to 4; or no dominant matrix color and multicolored in shades of brown and gray

Texture—clay

Aljibe Series

Depth class: Shallow

Drainage class: Well drained

Permeability: Moderate

Parent material: Iron-rich residuum that weathered from serpentinite bedrock

Landscape: Mountains

Landform: Mountain slopes

Commonly associated soils: Cerro Gordo, El Descanso, Guamá, Hoconuco, and Indiera soils

Slope: 20 to 60 percent

Taxonomic class: Clayey, ferruginous, isothermic, shallow Rhodic Haploperox

Typical Pedon

Aljibe soil in an area of Aljibe-Guamá-Indiera complex, 20 to 60 percent slopes; about 4.2 miles east of the community of Rosario from the intersection of Puerto Rico Highways 330 and 348; about 2.1 miles northeast from the intersection of Puerto Rico Highways 119 and 348; about 0.35 mile west on El Alto del Descanso trail road cut, in forestland; San Germán Municipality; USGS Rosario topographic quadrangle (1964); lat. 18 degrees 9 minutes 26.3 seconds N. and long. 67 degrees 0 minutes 12.3 seconds W.

Oi—0 to 5 inches; black (10YR 2/1) mucky peat; about 75 percent fiber crushed and rubbed; massive; friable, nonsticky, nonplastic; many very fine and fine roots; strongly acid; very abrupt smooth boundary.

A—5 to 16 inches; dusky red (10R 3/4) clay; moderate very fine and fine subangular blocky structure; soft, friable, slightly sticky, moderately plastic; many very fine and fine roots; few very fine and fine irregular pores; moderately acid; clear smooth boundary.

Bo1—16 to 27 inches; dusky red (10R 3/3) clay; strong very fine and fine subangular blocky structure; slightly hard, firm, slightly sticky, moderately plastic; common

very fine and fine and few medium and coarse roots; common very fine and fine irregular pores; slightly acid; clear smooth boundary.

Bo2—27 to 31 inches; 50 percent dusky red (10R 3/3) and 50 percent dark reddish brown (2.5YR 3/4) clay; moderate very fine and fine subangular blocky structure; slightly hard, firm, slightly sticky, moderately plastic; common fine and few medium and coarse roots; common fine irregular and few very fine tubular pores; neutral; clear wavy boundary.

BC—31 to 35 inches; dark reddish brown (2.5YR 3/4) silty clay loam; weak very fine and fine subangular blocky structure; soft, friable, slightly sticky, moderately plastic; few fine, medium, and coarse roots; common fine irregular and few very fine tubular pores; about 10 percent, by volume, parapebbles; neutral; very abrupt wavy boundary.

Cr—35 to 47 inches; highly fractured, moderately weathered serpentinite bedrock.

R—47 to 80 inches; hard, fractured, consolidated serpentinite bedrock.

Range in Characteristics

Thickness of the solum: 11 to 26 inches

Depth to bedrock: 25 to 40 inches

Content of iron-manganese concretions: Less than 15 percent, by volume

Reaction: Very strongly acid to moderately acid in the Oi and A horizons; moderately acid to slightly acid in the upper part of the Bo horizon; and slightly acid or neutral in the lower part of the Bo horizon and in the BC horizon

Oi horizon:

Color—hue of 7.5YR or 10YR, value of 2 or 2.5, and chroma of 1 or 2

Texture—mucky peat

A horizon:

Color—hue of 10R or 2.5YR, value of 3, and chroma of 2 to 4

Texture—clay

Bo horizon:

Color—hue of 10R or 2.5YR, value of 3 or 4, and chroma of 3 or 4

Texture—clay

BC horizon:

Color—hue of 2.5YR or 5YR, value of 3 or 4, and chroma of 4 to 6

Texture—silty clay loam or clay loam

C horizon (where present):

Color—hue of 5YR, value of 4, and chroma of 4

Texture—clay loam

Cr horizon:

Type of paralithic contact—hard, fractured, moderately weathered serpentinite that can be excavated with difficulty using hand tools and is rippable by mechanical equipment

R layer:

Type of bedrock—hard, fractured, consolidated serpentinite bedrock

Altamira Series

Depth class: Deep

Drainage class: Well drained

Permeability: Moderate

Parent material: Material that weathered from soft limestone bedrock

Landscape: Hills

Landform: Hillslopes

Commonly associated soils: Casabe, Costa, Guayacán, La Covana, Melones, Parguera, Pitahaya, and Seboruco soils

Slope: 2 to 60 percent

Taxonomic class: Coarse-loamy, carbonatic, isohyperthermic Typic Haplocalcids

Typical Pedon

Altamira gravelly clay, 2 to 20 percent slopes (fig. 21); about 3.7 miles northeast of the community of El Combate, southeast from the intersection of Puerto Rico Highways 301 and 303; about 200 feet east of the highway, in a hayfield; Cabo Rojo Municipality; USGS Cabo Rojo topographic quadrangle (1966); lat. 17 degrees 59 minutes 30 seconds N. and long. 67 degrees 9 minutes 28 seconds W.

Ap—0 to 8 inches; very dark brown (10YR 2/2) gravelly clay, very dark grayish brown (10YR 3/2) dry; moderate medium granular structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine to medium roots throughout; many very fine and fine interstitial pores; about 25 percent, by volume, pebbles; strongly effervescent; moderately alkaline; abrupt wavy boundary.

Bk—8 to 14 inches; brown (10YR 4/3) clay, brown (10YR 5/3) dry; weak medium subangular blocky structure; soft, very friable, moderately sticky, moderately plastic; many very fine and fine roots throughout; many very fine and fine interstitial pores; many prominent masses and concretions of calcium carbonate; strongly effervescent; moderately alkaline; clear smooth boundary.

C1—14 to 21 inches; very pale brown (10YR 8/3) clay loam, very pale brown (10YR 8/2) dry; massive; soft, very friable, slightly sticky, slightly plastic; many very fine and common fine roots; many very fine and common fine interstitial pores; many prominent masses and concretions of calcium carbonate; strongly effervescent; moderately alkaline; clear smooth boundary.

C2—21 to 33 inches; very pale brown (10YR 8/3) clay loam, very pale brown (10YR 8/2) dry; massive; soft, very friable, slightly sticky, slightly plastic; many very fine and common fine roots; many very fine and common fine interstitial pores; many prominent masses and concretions of calcium carbonate; strongly effervescent; strongly alkaline; gradual smooth boundary.

C3—33 to 43 inches; pale brown (10YR 6/3) clay loam, light gray (10YR 7/2) dry; massive; soft, very friable, slightly sticky, slightly plastic; many very fine and common fine roots; many very fine and common fine interstitial pores; many prominent masses and concretions of calcium carbonate; strongly effervescent; strongly alkaline; gradual smooth boundary.

C4—43 to 54 inches; grayish brown (2.5Y 5/3) loam, light yellowish brown (2.5Y 6/3) dry; massive; slightly hard, friable, slightly sticky, slightly plastic; many very fine and common fine roots; many very fine interstitial pores; many prominent masses and concretions of calcium carbonate; strongly effervescent; strongly alkaline; clear smooth boundary.

Cr—54 to 80 inches; 50 percent light olive brown (2.5Y 5/3) and 50 percent very pale brown (10YR 8/3) stratified soft limestone bedrock, 50 percent light yellowish brown (2.5Y 6/3) and 50 percent very pale brown (10YR 8/3) dry; moderate medium and thick platy rock structure; few fine roots in fractures; stratified layers having a combined thickness of 8 to 12 inches; strongly effervescent; moderately alkaline.

Range in Characteristics

Thickness of the solum: 6 to 14 inches

Depth to soft bedrock: 40 to 60 inches

Content (by volume) and size of rock fragments: 5 to 60 percent, mainly pebbles and cobbles, in the A or Ap horizon; 0 to 25 percent, mainly pebbles and cobbles, in the



Figure 21.—Profile of Altamira gravelly clay, 2 to 20 percent slopes. Altamira soils are characterized by a surface layer of gravelly clay and stratified layers of soft limestone bedrock. They are in the aridic soil moisture regime.

Bk and BCK horizons; and 0 to 15 percent, mainly pebbles and cobbles, in the C horizon

Reaction: Moderately alkaline or strongly alkaline throughout

A or Ap horizon:

Color—hue of 10YR, value of 2 or 3, and chroma of 2 or 3

Texture—loam, clay loam, clay, or their gravelly or very gravelly analogs

Bk horizon :

Color—hue of 7.5YR to 2.5Y, value of 3 to 8, and chroma of 1 to 6

Texture—loam, silt loam, silty clay loam, clay loam, clay, or their very gravelly analogs

Calcium carbonate—common or many nodules, soft masses of concretions, filaments, and threads

BCK horizon (where present):

Color—hue of 7.5YR to 2.5Y, value of 4 to 8, and chroma of 4 to 6

Texture—loam, silt loam, silty clay loam, clay loam, clay, or their very gravelly analogs

Calcium carbonate—common or many nodules, soft masses of concretions, filaments, and threads

C horizon:

Color—hue of 7.5YR to 2.5Y, value of 6 to 8, and chroma of 1 to 6

Texture—loam, silt loam, clay loam, or their gravelly analogs

Cr layer:

Type of bedrock—soft limestone that can be excavated with difficulty using hand tools and is rippable by mechanical equipment

Atolladero Series

Depth class: Very deep

Drainage class: Poorly drained

Permeability: Rapid

Parent material: Regolith consisting of sand-sized shell fragments, quartz grains, and subrounded volcanic fragments of recent beach deposits

Landscape: Coastal plains

Landform: Tidal marshes

Commonly associated soils: Bajura, Cataño, Guanajibo, and Joyuda soils

Slope: 0 to 2 percent

Taxonomic class: Carbonatic, isohyperthermic Typic Psammaquents

Typical Pedon

Atolladero soil in an area of Joyuda, Atolladero, and Bajura soils, very frequently flooded; about 2.45 miles northwest of the city of Cabo Rojo from the intersection of Puerto Rico Highways 102 and 311; about 0.3 mile southeast of the community of Joyuda on Puerto Rico Highway 102; about 800 feet south of a dirt road from its intersection with Puerto Rico Highway 102, in an area of wildlife habitat; Cabo Rojo Municipality; USGS Puerto Real topographic quadrangle (1966); lat. 18 degrees 6 minutes 44 seconds N. and long. 67 degrees 10 minutes 47 seconds W.

Oa—0 to 2 inches; black (10YR 2/1) mucky loam; less than 5 percent fiber rubbed; weak fine granular structure; very friable, slightly sticky, nonplastic; many fine pores; strongly effervescent; moderately alkaline; abrupt wavy boundary.

Cg1—2 to 20 inches; dark greenish gray (10Y 4/1) loamy sand; massive; very friable, nonsticky, nonplastic; many fine interstitial pores; strongly effervescent; moderately alkaline; clear smooth boundary.

Cg2—20 to 32 inches; very dark greenish gray (10Y 3/1) loamy sand; massive; very friable, nonsticky, nonplastic; many fine interstitial pores; common medium prominent dark yellowish brown (10YR 3/4) masses of iron accumulation; strongly effervescent; moderately alkaline; clear smooth boundary.

Cg3—32 to 60 inches; greenish black (10Y 2.5/1) loamy sand; massive; very friable, nonsticky, nonplastic; many fine interstitial pores; strongly effervescent; moderately alkaline.

Range in Characteristics

Thickness of the profile: More than 60 inches

Reaction: Moderately alkaline throughout

Oa horizon:

Color—hue of 10YR, value of 2 or 3, and chroma of 1

Texture—mucky loam

Cg horizon (upper part):

Color—hue of 5Y or 10Y, value of 3 to 6, and chroma of 1 or 2

Texture—loamy sand or sandy loam

Redoximorphic features (where present)—common or many masses of iron accumulation in shades of brown

Cg horizon (lower part):

Color—hue of 10Y to 5GY, value of 2.5 or 3, and chroma of 1

Texture—loamy sand

Bahía Series

Depth class: Very deep

Drainage class: Excessively drained

Permeability: Rapid

Parent material: Sandy marine deposits

Landscape: Coastal plains

Landform: Coastal plains

Commonly associated soils: Bahía Salinas, Guayabo, and Sosa soils

Slope: 0 to 5 percent

Taxonomic class: Sandy, kaolinitic, isohyperthermic Typic Paleargids

Typical Pedon

Bahía fine sand, 0 to 5 percent slopes; about 1.0 mile southwest of the intersection of Puerto Rico Highways 301 and 3301; about 0.3 mile west of the community of Pole Ojea; about 1,100 feet northwest of Puerto Rico Highway 301, in an area of wildlife habitat; Cabo Rojo Municipality; USGS Cabo Rojo topographic quadrangle (1966); lat. 17 degrees 58 minutes 12 seconds N. and long. 67 degrees 11 minutes 43 seconds W.

Ap—0 to 6 inches; dark reddish brown (5YR 3/3) fine sand; single grained; loose, loose, nonsticky, nonplastic; common fine roots; few black (10YR 2/1) manganese concretions; moderately acid; clear smooth boundary.

Bt1—6 to 17 inches; dark reddish brown (2.5YR 3/4) loamy sand; single grained; loose, nonsticky, nonplastic; few fine roots; few faint clay films between mineral grains; few volcanic fragments; slightly acid; clear wavy boundary.

Bt2—17 to 26 inches; dark red (2.5YR 3/6) sand; single grained; loose, nonsticky, nonplastic; few fine roots; few faint clay films between mineral grains; few volcanic fragments; slightly acid; gradual wavy boundary.

Bt3—26 to 45 inches; dark reddish brown (2.5YR 3/4) loamy sand; single grained; loose, nonsticky, nonplastic; few fine roots; few faint clay films between mineral grains; few volcanic fragments; slightly acid; gradual wavy boundary.

Bt4—45 to 60 inches; dark reddish brown (2.5YR 3/4) fine sandy loam; massive; soft, very friable, nonsticky, nonplastic; few fine roots; few faint clay films between mineral grains; few volcanic fragments; neutral; gradual wavy boundary.

Bt5—60 to 67 inches; dark reddish brown (2.5YR 3/4) fine sandy loam; massive; soft, very friable, nonsticky, slightly plastic; few faint clay films between mineral grains; few volcanic fragments; slightly acid.

Range in Characteristics

Thickness of the solum: More than 60 inches

Reaction: Strongly acid or moderately acid in the A or Ap horizon and strongly acid to neutral in the Bt horizon

A or Ap horizon:

Color—hue of 2.5YR or 5YR, value of 3 or 4, and chroma of 3 to 6

Texture—sand, fine sand, loamy sand, or loamy fine sand

Bt horizon (upper part):

Color—hue of 2.5YR or 5YR, value of 3 or 4, and chroma of 4 to 6

Texture—sand, fine sand, loamy sand, or loamy fine sand

Bt horizon (lower part):

Color—hue of 2.5YR or 5YR, value of 3 or 4, and chroma of 4 to 6

Texture—sandy loam or fine sandy loam

Bahía Salinas Series

Depth class: Very deep

Drainage class: Excessively drained

Permeability: Very rapid

Parent material: Calcareous, sandy marine deposits

Landscape: Coastal plains

Landform: Coastal beaches

Commonly associated soils: Bahía, Bahía Salinas, Guayabo, and Sosa soils

Slope: 0 to 5 percent

Taxonomic class: Carbonatic, isohyperthermic Typic Torripsamments

Typical Pedon

Bahía Salinas sand, 0 to 5 percent slopes, rarely flooded; about 0.4 mile south of the community of El Combate from the Puerto Rico Highway 3301 dead end; about 100 feet west of a sand road, in an area of wildlife habitat; Cabo Rojo Municipality; USGS Cabo Rojo topographic quadrangle (1966); lat. 17 degrees 58 minutes 28 seconds N. and long. 67 degrees 12 minutes 45 seconds W.

A—0 to 6 inches; brown (10YR 4/3) sand; single grained; loose, nonsticky, nonplastic; many very fine and few medium and coarse roots; about 10 percent, by volume, coral and shell fragments; moderately alkaline; violently effervescent; clear smooth boundary.

C1—6 to 21 inches; brown (10YR 4/3) sand; single grained; loose, nonsticky, nonplastic; about 10 percent, by volume, coral and shell fragments; moderately alkaline; violently effervescent; gradual smooth boundary.

C2—21 to 80 inches; brown (10YR 5/3) sand; single grained; loose, nonsticky, nonplastic; about 10 percent, by volume, coral and shell fragments; moderately alkaline; violently effervescent.

Range in Characteristics

Thickness of the profile: More than 60 inches

Content (by volume) and size of rock fragments: 5 to less than 15 percent coral and shell fragments in the A and C horizons

Reaction: Slightly alkaline or moderately alkaline throughout

A horizon:

Color—hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 2 or 3

Texture—sand, fine sand, loamy sand, or loamy fine sand

C horizon (upper part):

Color—hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 2 to 4

Texture—sand or fine sand

C horizon (lower part):

Color—hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 3 to 6

Texture—sand or fine sand

Bajura Series

Depth class: Very deep

Drainage class: Poorly drained

Permeability: Slow

Parent material: Alluvium of mixed origin

Landscape: River valleys

Landform: Flood plains and depressions

Commonly associated soils: Atolladero, Cataño, Coloso, Dique, Joyuda, Lares, Reilly, and Toa soils

Slope: 0 to 1 percent

Taxonomic class: Fine, mixed, superactive, isohyperthermic Vertic Endoaquolls

Typical Pedon

Bajura clay, 0 to 1 percent slopes, frequently flooded; 1.1 miles northeast of downtown Cabo Rojo; 0.75 mile north from the intersection of Puerto Rico Highways 102 and 103; about 0.5 mile northwest from Puerto Rico Highway 103 on a dirt road, in pastureland; Cabo Rojo Municipality; USGS Puerto Real topographic quadrangle (1960); lat. 18 degrees 6 minutes 4 seconds N. and long. 67 degrees 8 minutes 19 seconds W.

Ap—0 to 4 inches; very dark grayish brown (2.5Y 3/2) clay; strong fine and medium subangular blocky structure; slightly hard, firm, slightly sticky, slightly plastic; many fine and medium roots; many fine and medium irregular pores; neutral; clear smooth boundary.

Bw—4 to 16 inches; very dark grayish brown (2.5Y 3/2) clay; strong medium prismatic structure; very hard, very firm, slightly sticky, plastic; many prominent pressure faces on peds; many fine and medium roots; common fine and medium irregular pores; common fine and medium dark reddish brown (5YR 3/2) and very dark gray (7.5YR 3/1) masses of iron accumulation on ped surfaces and along root channels; neutral; clear wavy boundary.

Bwg—16 to 42 inches; very dark gray (N 3/0) clay; strong medium and coarse prismatic structure; very hard, very firm, slightly sticky, plastic; many prominent pressure faces on peds; few fine roots; few fine and medium irregular pores;

common fine and medium very dark gray (5YR 3/1) and dark brown (7.5YR 3/3) masses of iron accumulation on surfaces along root channels; neutral; clear smooth boundary.

Cg1—42 to 47 inches; very dark greenish gray (10Y 3/1) clay; massive; hard, firm, slightly sticky, plastic; few fine roots; many fine and medium irregular pores; many fine yellowish red (5YR 4/6) masses of iron accumulation on surfaces along root channels; neutral; clear wavy boundary.

Cg2—47 to 60 inches; black (N 2.5/0) clay; massive; hard, firm, slightly sticky, plastic; few fine roots; many fine and medium irregular pores; common fine and medium yellowish red (5YR 4/6) masses of iron accumulation on surfaces along root channels; many distinct dark greenish gray (10Y 4/1) areas having less iron and manganese than the matrix; moderately alkaline; gradual wavy boundary.

Cg3—60 to 80 inches; black (N 2.5/0) clay; massive; hard, firm, slightly sticky, plastic; few fine roots; common fine and medium dark red (2.5YR 3/6) masses of iron accumulation on surfaces along root channels; moderately alkaline.

Range in Characteristics

Thickness of the solum: More than 60 inches

Reaction: Moderately acid to moderately alkaline throughout

A or Ap horizon:

Color—hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2

Texture—clay

Bw horizon:

Color—hue of 2.5Y, value of 3 to 6, and chroma of 1 or 2; or neutral in hue and value of 3 to 6

Texture—silty clay or clay

Redoximorphic features—few or common masses of iron accumulation in shades of brown and yellow

Bwg horizon:

Color—hue of 2.5Y to 10Y, value of 3 or 4, and chroma of 1; or neutral in hue and value of 3 or 4

Texture—clay

Redoximorphic features—few or common masses of iron accumulation in shades of brown and yellow

Cg horizon:

Color—hue of 2.5Y to 10Y, value of 2.5 to 4, and chroma of 1; or neutral in hue and value of 2.5 to 4

Texture—clay

Redoximorphic features—few to many masses of iron accumulation in shades of brown and yellow

Bermeja Series

Depth class: Shallow

Drainage class: Well drained

Permeability: Moderate

Parent material: Residuum and colluvium that weathered from basalt, chert, and rhyolite

Landscape: Hills and mountains

Landform: Ridges, hillslopes, and mountain slopes

Commonly associated soils: Casabe, Cerro Mariquita, Llanos Costa, and Maguayo soils

Slope: 5 to 60 percent

Taxonomic class: Loamy, mixed, active, isohyperthermic, shallow Typic Haplocambids

Typical Pedon

Bermeja extremely cobbly sandy loam in an area of Bermeja-Rock outcrop complex, 20 to 60 percent slopes, extremely cobbly; Sierra Bermeja Mountain Range; about 1,500 feet northwest of Rancho Cabassa; about 50 feet southwest of the summit; Cabo Rojo Municipality; USGS Parguera topographic quadrangle (1966); lat. 17 degrees 59 minutes 17 seconds N. and long. 67 degrees 7 minutes 28 seconds W.

A—0 to 2 inches; dark reddish brown (5YR 3/3) extremely cobbly sandy loam; weak fine and medium granular structure; slightly hard, friable, slightly sticky, slightly plastic; many fine roots; common very fine interstitial pores; about 45 percent, by volume, cobbles and 20 percent, by volume, pebbles; moderately acid; clear wavy boundary.

Bw—2 to 8 inches; reddish brown (5YR 4/4) extremely paragravelly sandy clay loam; weak fine and medium subangular blocky structure; soft, friable, slightly sticky, slightly plastic; common fine roots; common fine and medium interstitial and tubular pores; about 65 percent, by volume, parapebbles; strongly acid; clear wavy boundary.

Cr—8 to 27 inches; red (2.5YR 4/6) saprolite that has a texture of extremely paragravelly clay; massive; hard, firm, slightly sticky, slightly plastic; about 70 percent, by volume, parapebbles; strongly acid; clear wavy boundary.

R—27 inches; hard, unweathered chert bedrock.

Range in Characteristics

Thickness of the solum: 8 to 20 inches

Depth to bedrock: 20 to 35 inches

Content (by volume) and size of rock fragments: 35 to 70 percent pebbles and cobbles in the A or Ap horizon and 35 to 70 percent parapebbles and paracobbles in the Bw and C horizons

Reaction: Strongly acid to slightly acid throughout

A horizon:

Color—hue of 5YR to 10YR, value of 3 or 4, and chroma of 3 or 4

Texture—sandy loam, loam, sandy clay loam, sandy clay, or their extremely cobbly analogs

Bw horizon:

Color—hue of 2.5Y to 5YR, value of 4 or 5, and chroma of 4 to 8

Texture—loam, sandy clay loam, clay loam, or their extremely paragravelly analogs

C horizon (where present):

Color—hue of 2.5Y to 5YR, value of 4 or 5, and chroma of 4 to 8

Texture—loam, sandy clay loam, clay loam, or their extremely paragravelly analogs

Cr horizon:

Type of bedrock—saprolite composed of basalt, chert, or rhyolite that can be excavated with difficulty using hand tools and is rippable by mechanical equipment

R layer:

Type of bedrock—hard, unweathered basalt, chert, or rhyolite

Boquerón Series

Depth class: Very deep

Drainage class: Very poorly drained

Permeability: Slow

Parent material: Clayey, alluvial and marine sediments

Landscape: Coastal plains

Landform: Tidal flats and marshes

Commonly associated soils: Manglillo, Serrano, and Teresa soils

Slope: 0 to 1 percent

Taxonomic class: Fine, mixed, superactive, nonacid, isohyperthermic Vertic Fluvaquents

Typical Pedon

Boquerón soil in an area of Manglillo, Boquerón, and Serrano soils, very frequently flooded; about 0.9 mile southwest of the community of Las Arenas from the intersection of Puerto Rico Highway 3301 at the Boquerón Bird Refuge facilities; 200 feet south of a gravel road, in a mangrove swamp; Cabo Rojo Municipality; USGS Puerto Real topographic quadrangle (1966); lat. 18 degrees 1 minute 10 seconds N. and long. 67 degrees 9 minutes 35 seconds W.

Oa—0 to 2 inches; very dark gray (2.5Y 3/1) muck; about 60 percent, by volume, fiber unrubbed and 15 percent rubbed; weak fine granular structure; very friable, nonsticky, nonplastic; many fine and medium roots; moderately alkaline; abrupt smooth boundary.

A—2 to 4 inches; dark grayish brown (2.5Y 4/2) silty clay; weak fine granular structure; firm, slightly sticky, slightly plastic; common fine roots; common medium faint olive brown (2.5Y 4/3) masses of iron accumulation along root channels; moderately alkaline; clear wavy boundary.

Cg1—4 to 8 inches; 50 percent black (N 2.5/0) and 50 percent very dark gray (N 3/0) mucky clay loam; massive; firm, sticky, plastic; few fine roots; about 5 percent, by volume, shell fragments; moderately alkaline; clear wavy boundary.

Cg2—8 to 12 inches; dark gray (N 4/0) silty clay; massive; firm, sticky, plastic; common medium prominent red (2.5YR 4/8) and yellowish red (5YR 5/8) masses of iron accumulation; moderately alkaline; clear wavy boundary.

Cg3—12 to 55 inches; dark gray (N 4/0) silty clay; massive; firm, sticky, plastic; moderately alkaline; clear wavy boundary.

Cg4—55 to 80 inches; greenish gray (10Y 5/1) clay; massive; firm, sticky, plastic; common medium distinct olive brown (2.5Y 4/4) masses of iron accumulation; moderately alkaline.

Range in Characteristics

Thickness of the solum: 1 to 4 inches to gleyed horizons

Content (by volume) and size of rock fragments: 0 to 30 percent shell fragments in the Cg horizon

Reaction: Moderately alkaline throughout

Oa horizon (where present):

Color—hue of 10YR to 5Y, value of 2.5 to 4, and chroma of 1 or 2

Texture—muck or mucky loam

A horizon:

Color—hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 or 2

Texture—silty clay loam or silty clay

Cg horizon (upper part):

Color—hue of 2.5Y or 5Y, value of 4 or 5, and chroma of 1 or 2; or neutral in hue and value of 2.5 to 5

Texture—clay loam, mucky clay loam, silty clay, or clay

Redoximorphic features—common or many masses of iron accumulation in shades of red and brown

Cg horizon (lower part):

Color—hue of 5Y to 10Y, value of 4 to 6, and value of 1; or neutral in hue and value of 1

Texture—clay loam, mucky clay loam, or silty clay

Redoximorphic features—none to common masses of iron accumulation in shades of red and brown

Cabo Rojo Series

Depth class: Very deep

Drainage class: Moderately well drained

Permeability: Moderate

Parent material: Fine textured colluvium from soils that weathered from volcanic bedrock

Landscape: Hills

Landform: Hillslopes

Commonly associated soils: Guanajibo, Múcara, and Voladora soils

Slope: 2 to 12 percent

Taxonomic class: Fine, mixed, semiactive, isohyperthermic Vertic Paleudults

Typical Pedon

Cabo Rojo clay, 2 to 12 percent slopes; about 1.5 miles southwest of downtown Cabo Rojo; about 0.65 mile northwest from the intersection of Puerto Rico Highways 307 and 308; about 0.25 mile northwest from Puerto Rico Highway 308, in native pasture; Cabo Rojo, Municipality; USGS Puerto Real topographic quadrangle (1966); lat. 18 degrees 5 minutes 2 seconds N. and long. 67 degrees 10 minutes 8 seconds W.

Ap—0 to 2 inches; very dark grayish brown (10YR 3/2) clay; moderate fine and medium granular structure; soft, friable, nonsticky, slightly plastic; many very fine and fine roots; many very fine and fine interstitial pores; about 12 percent, by volume, pebbles; strongly acid; clear smooth boundary.

Bt1—2 to 5 inches; very dark grayish brown (10YR 3/2) clay; strong medium and coarse subangular blocky structure; very hard, very firm, slightly sticky, slightly plastic; common faint pressure faces on surfaces of peds; common faint clay films on faces of peds; common very fine and fine roots; common fine and medium interstitial pores; strongly acid; abrupt wavy boundary.

Bt2—5 to 19 inches; dark yellowish brown (10YR 4/4) clay; strong medium to very coarse subangular blocky structure; very hard, very firm, slightly sticky, slightly plastic; many faint pressure faces on surfaces of peds; many distinct clay films on faces of peds; few fine and medium roots; few fine and medium interstitial pores; moderately acid; abrupt wavy boundary.

Bt3—19 to 26 inches; dark yellowish brown (10YR 4/4) clay; weak medium and coarse subangular blocky structure; slightly hard, firm, slightly sticky, slightly plastic; many faint pressure faces on surfaces of peds; common distinct clay films on faces of peds; few fine roots; common fine and medium interstitial pores; few fine prominent strong brown (7.5YR 5/6) masses of iron accumulation; few fine prominent grayish brown (2.5Y 5/2) iron depletions; slightly acid; abrupt smooth boundary.

BC—26 to 36 inches; brown (7.5YR 4/4) clay loam; weak fine and medium subangular blocky structure; slightly hard, firm, slightly sticky, slightly plastic; few fine roots; common very fine vesicular pores; common fine and medium prominent red

(2.5YR 4/8) and reddish yellow (7.5YR 7/8) masses of iron accumulation; common fine prominent light gray (5Y 7/2) iron depletions; slightly acid; abrupt smooth boundary.

C—36 to 72 inches; brown (7.5YR 4/4) silty clay loam; massive; slightly hard, firm, nonsticky, slightly plastic; few fine roots; few very fine and fine vesicular pores; few fine and medium prominent yellowish red (5YR 5/8) masses of iron accumulation; common fine prominent light gray (5Y 7/2) and light greenish gray (5GY 7/1) iron depletions; slightly acid.

Range in Characteristics

Thickness of the solum: 20 to 45 inches

Content (by volume) and size of rock fragments: Less than 15 percent pebbles throughout

Reaction: Slightly acid to strongly acid in the A and Bt horizons and slightly acid or neutral in the BC or C horizons

A or Ap horizon:

Color—hue of 10YR, value of 3, and chroma of 2 to 4

Texture—clay loam or clay

AB horizon (where present):

Color—hue of 10YR, value of 3, and chroma of 3

Texture—clay

Bt horizon:

Color—hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 6

Texture—clay

BC horizon (where present):

Color—hue of 7.5YR, value of 4, and chroma of 4; or no dominant color and multicolored in shades of red, brown, yellow, and gray

Texture—clay loam or clay

C horizon:

Color—hue of 7.5YR, value of 4, and chroma of 4; or no dominant color and multicolored in shades of red, brown, yellow, and gray

Texture—silty clay loam, clay loam, or clay

Caguabo Series

Depth class: Shallow

Drainage class: Well drained

Permeability: Moderate

Parent material: Residuum and colluvium that weathered from basalt bedrock

Landscape: Hills and mountains

Landform: Hillslopes and mountain slopes

Commonly associated soils: Consumo, Humatas, La Tea, Malaya, Morado, Múcara, and Quebrada soils

Slope: 12 to 60 percent

Taxonomic class: Loamy, mixed, active, isohyperthermic, shallow Typic Eutrudepts

Typical Pedon

Caguabo clay loam, 20 to 60 percent slopes (fig. 22); about 1.3 miles southeast from the intersection of Puerto Rico Highways 128 and 373; about 1,400 feet northwest from Puerto Rico Highway 372 on a paved road; Yauco Municipality; USGS Yauco topographic quadrangle (1966); lat. 18 degrees 5 minutes 33 seconds N. and long. 66 degrees 50 minutes 46 seconds W.



Figure 22.—Profile of Caguabo clay loam, 20 to 60 percent slopes. Caguabo soils are characterized by a surface layer of clay loam and a subsurface layer of paragravelly silty clay loam over basalt bedrock.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) clay loam; strong very fine and fine granular structure; friable, slightly sticky, moderately plastic; about 5 percent, by volume, pebbles; many very fine and fine roots; common fine irregular and few fine tubular pores; neutral; clear smooth boundary.

Bw—6 to 13 inches; brown (10YR 4/3) paragravelly silty clay loam; moderate very fine and fine subangular blocky structure; friable, slightly sticky, slightly plastic; about 20 percent, by volume, parapebbles; common very fine and fine roots; common fine irregular and few fine tubular pores; neutral; abrupt wavy boundary.

Cr—13 to 19 inches; highly fractured basalt bedrock; abrupt wavy boundary.

R—19 inches; hard, consolidated, unweathered basalt bedrock.

Range in Characteristics

Thickness of the solum: 10 to 20 inches

Depth to bedrock: 5 to 19 inches

Content (by volume) and size of rock fragments: 2 to 20 percent pebbles and 5 percent cobbles in the A or Ap horizon and 2 to 70 percent pebbles and, in a few places, 20 to 75 percent parapebbles in the Bw horizon

Reaction: Moderately acid to neutral throughout

A or Ap horizon:

Color—hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3

Texture—clay loam or gravelly clay loam

Bw horizon:

Color—hue of 7.5YR to 2.5Y, value of 3 or 4, and chroma of 3 or 4

Texture—silty clay loam, clay loam, clay, or their paragravelly to extremely paragravelly analogs

BC horizon (where present):

Color—hue of 2.5Y, value of 5, and chroma of 4

Texture—silty clay loam or gravelly to extremely gravelly silty clay loam

Cr layer:

Type of bedrock—highly fractured basalt bedrock that can be excavated with difficulty using hand tools and is rippable by mechanical equipment

R layer:

Type of bedrock—Hard, consolidated, unweathered basalt bedrock

Cartagena Series

Depth class: Very deep

Drainage class: Somewhat poorly drained

Permeability: Slow

Parent material: Alluvium and clayey marine sediments

Landscape: Basins

Landform: Fan skirts

Commonly associated soils: Aguirre, Fé, Fraternidad, Guánica, Olivares, Santa Isabel, and Teresa soils

Slope: 0 to 2 percent

Taxonomic class: Fine, mixed, superactive, isohyperthermic Sodic Haplusterts

Typical Pedon

Cartagena clay, 0 to 2 percent slopes; about 1.5 miles southeast of the city of Lajas from the intersection of Puerto Rico Highways 116 and 117; about 0.6 mile northeast of

Hacienda Beatriz Soledad farmstead, in a pastureland; Lajas Municipality; USGS San Germán topographic quadrangle (1966); lat. 18 degrees 1 minute 16 seconds N. and long. 67 degrees 5 minutes 52 seconds W.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) clay; weak fine angular blocky structure; firm, slightly sticky, plastic; common fine roots; common fine tubular pores; few fine iron-manganese concretions; about 1 percent, by volume, pebbles; neutral; clear wavy boundary.

ABss1—7 to 15 inches; very dark grayish brown (10YR 3/2) clay; moderate medium angular blocky structure; firm, slightly sticky, plastic; common fine roots; common very fine and fine tubular pores; few faint intersecting slickensides having polished and grooved surfaces; few fine iron-manganese concretions; about 1 percent, by volume, pebbles; neutral; clear wavy boundary.

ABss2—15 to 22 inches; very dark gray (10YR 3/1) clay; strong moderate wedge-shaped aggregates and moderate fine angular blocky structure; firm, slightly sticky, plastic; few fine roots; common very fine and fine tubular pores; many distinct intersecting slickensides having polished and grooved surfaces; few fine iron-manganese concretions; about 2 percent, by volume, pebbles; neutral; clear wavy boundary.

Bss1—22 to 30 inches; black (10YR 2/1) clay; strong coarse wedged-shaped aggregates and weak coarse angular blocky structure; firm, slightly sticky, plastic; common fine tubular pores; many distinct intersecting slickensides having polished and grooved surfaces; about 2 percent, by volume, pebbles; slightly alkaline; clear irregular boundary.

Bss2—30 to 46 inches; dark grayish brown (10YR 4/2) clay; strong coarse wedge-shaped aggregates and weak angular blocky structure; firm, sticky, plastic; few fine tubular pores; common distinct intersecting slickensides having polished and grooved surfaces; common fine iron-manganese concretions; about 5 percent, by volume, pebbles; moderately alkaline; gradual wavy boundary.

Bw—46 to 60 inches; brown (10YR 4/3) clay; weak coarse angular blocky structure; firm, sticky, plastic; common fine iron-manganese concretions; about 5 percent, by volume, pebbles; moderately alkaline.

Range in Characteristics

Thickness of the solum: More than 80 inches

Content (by volume) and size of rock fragments: 0 to less than 5 percent pebbles throughout

Reaction: Neutral to moderately alkaline throughout

A or Ap horizon:

Color—hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 to 3

Texture—clay loam or clay

ABss horizon:

Color—hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 to 3

Texture—clay loam, silty clay, or clay

Salinity—Slight or moderate

Bss horizon:

Color—hue of 7.5YR to 2.5Y, value of 2 to 5, and chroma of 1 to 4

Texture—silty clay or clay

Salinity—Moderate

Bw horizon (where present):

Color—hue of 10YR, value of 4, and chroma of 3 to 6

Texture—clay

Casabe Series

Depth class: Shallow

Drainage class: Well drained

Permeability: Moderately slow

Parent material: Residuum that weathered from serpentinite bedrock

Landscape: Serpentine hills and mountains of the Sierra Bermeja Mountain Range

Landform: Ridges, hillslopes, and mountain slopes

Commonly associated soils: Altamira, Bermeja, Cerro Mariquita, Costa, and Pitahaya soils

Slope: 5 to 60 percent

Taxonomic class: Clayey, magnesian, isohyperthermic, shallow Ustic Haplargids

Typical Pedon

Casabe clay, 5 to 20 percent slopes; about 2.9 miles southwest of the community of Boquerón from the intersection of Puerto Rico Highways 100 and 101, in naturalized pastureland; Cabo Rojo Municipality; USGS Puerto Real topographic quadrangle (1966); lat. 17 degrees 59 minutes 58 seconds N. and long. 67 degrees 11 minutes 46 seconds W.

A—0 to 7 inches; very dark grayish brown (10YR 3/2) clay; strong medium and coarse granular structure; very hard, extremely firm, slightly sticky, very plastic; many prominent pressure faces on peds; many very fine and fine roots; many very fine and fine irregular pores; about 12 percent, by volume, angular pebbles; neutral; clear wavy boundary.

Bt—7 to 16 inches; very dark grayish brown (10YR 3/2) clay; strong fine and medium subangular blocky structure; very hard, extremely firm, slightly sticky, very plastic; many prominent clay films on faces of peds; common very fine and fine roots; common very fine and fine irregular pores; about 10 percent, by volume, angular parapebbles; neutral; abrupt wavy boundary.

Cr—16 to 38 inches; hard, fractured, moderately weathered serpentinite bedrock.

R—38 inches; hard, fractured, consolidated serpentinite bedrock.

Range in Characteristics

Thickness of the solum: 9 to 17 inches

Depth to bedrock: 9 to 17 inches

Content (by volume) of rock fragments: Less than 35 percent throughout

Reaction: Neutral throughout

A or Ap horizon:

Color—hue of 7.5YR or 10YR, value of 2 to 3, and chroma of 1 or 2

Texture—clay

Bt horizon:

Color—hue of 7.5YR or 10YR, value of 2 to 3, and chroma of 1 to 3

Texture—clay

Cr horizon:

Type of paralithic contact—hard, fractured, moderately weathered serpentinite that can be excavated with difficulty using hand tools and is rippable by mechanical equipment

R layer:

Type of bedrock—hard, fractured, consolidated serpentinite bedrock

Cataño Series

Depth class: Very deep

Drainage class: Excessively drained

Permeability: Rapid

Parent material: Beach sand deposits consisting of shell fragments, quartz grains, and igneous rock fragments

Landscape: Coastal plains

Landform: Coastal beaches

Commonly associated soils: Atolladero, Bajura, Guanajibo, Joyuda, and Mabi soils

Slope: 0 to 2 percent

Taxonomic class: Carbonatic, isohyperthermic Typic Udipsamments

Typical Pedon

Cataño sand, 0 to 2 percent slopes; about 2.3 miles northwest from the intersection of Puerto Rico Highways 114 and 311; about 250 feet southeast from Puerto Rico Highway 102, in an abandoned coconut plantation; Cabo Rojo Municipality; USGS Mayagüez topographic quadrangle (1964); lat. 18 degrees 8 minutes 36 seconds N. and long. 67 degrees 10 minutes 45 seconds W.

A—0 to 8 inches; very dark gray (10YR 3/1) sand; single grained; loose, nonsticky, nonplastic; many very fine and few medium and coarse roots; many very fine and fine interstitial pores; less than 15 percent, by volume, shell fragments; moderately alkaline; strongly effervescent; abrupt wavy boundary.

AC—8 to 11 inches; very dark grayish brown (10YR 3/2) coarse sand; single grained; loose, nonsticky, nonplastic; few fine patchy faint very dark grayish brown (2.5Y 3/2) organic films on sand grains; few fine and medium roots; many very fine and fine interstitial pores; about 10 percent, by volume, shell fragments; moderately alkaline; violently effervescent; clear wavy boundary.

C1—11 to 54 inches; grayish brown (10YR 5/2) gravelly coarse sand; single grained; loose, nonsticky, nonplastic; few fine roots; many very fine and fine interstitial pores; about 20 percent, by volume, shell fragments; moderately alkaline; violently effervescent; abrupt wavy boundary.

C2—54 to 80 inches; light yellowish brown (10YR 6/4) coarse sand; single grained; loose, nonsticky, nonplastic; few fine and medium weakly cemented aggregates of filaments and threads of secondary calcium carbonate; moderately alkaline; strongly effervescent.

Range in Characteristics

Thickness of the profile: The layers of sand have a combined thickness of more than 80 inches.

Content (by volume) and size of rock fragments: 0 to 25 percent subrounded pebbles of volcanic origin or pebble-sized shell fragments

Reaction: Moderately alkaline throughout

A or Ap horizon:

Color—hue of 10YR, value of 3 to 7, and chroma of 1 or 2

Texture—coarse sand or sand

AC horizon:

Color—hue of 10YR, value of 3 to 5, and chroma of 2 or 3

Texture—coarse sand or sand

C horizon:

Color—hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 2 to 4

Texture—coarse sand or sand

Cerro Gordo Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderate

Parent material: Iron-rich residuum that weathered from serpentinite bedrock

Landscape: Serpentinite mountains

Landform: Ridges

Commonly associated soils: Aljibe, El Descanso, Guamá, Hoconuco, and Indiera soils

Slope: 2 to 20 percent

Taxonomic class: Fine-loamy, mixed, isothermic Typic Haploperox

Typical Pedon

Cerro Gordo mucky peat, 5 to 20 percent slopes; about 0.2 mile south from the intersection of Puerto Rico Highway 120 and the main entrance of the Maricao State Forest Headquarters (Campamento Buena Vista) on a forest trail road cut; San Germán Municipality; USGS Maricao topographic quadrangle (1960); lat. 18 degrees 9 minutes 4 seconds N. and long. 66 degrees 59 minutes 37 seconds W.

Oi—0 to 3 inches; black (5YR 2.5/1) mucky peat, crushed and rubbed; about 60 percent fiber; weak very fine granular structure; soft, friable, nonsticky, nonplastic; many very fine and fine roots; many very fine, fine, and medium irregular pores; noneffervescent; very strongly acid; abrupt smooth boundary.

A—3 to 11 inches; dark reddish brown (5YR 3/3) gravelly clay; moderate very fine and fine granular structure; soft, friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and fine irregular pores; about 25 percent, by volume, ironstone pebbles; noneffervescent; very strongly acid; diffuse smooth boundary.

Bo1—11 to 23 inches; dark reddish brown (2.5YR 3/3) gravelly clay loam; weak very fine and fine subangular blocky structure; soft, friable, slightly sticky, slightly plastic; common very fine and fine roots; common very fine and fine irregular and few very fine tubular pores; about 27 percent, by volume, ironstone pebbles; noneffervescent; very strongly acid; clear wavy boundary.

Bo2—23 to 40 inches; red (2.5YR 4/6) gravelly sandy clay loam; moderate very fine and fine subangular blocky structure; soft, friable, slightly sticky, slightly plastic; few continuous faint ferriargillans on faces of peds; common very fine and fine roots; common very fine and fine irregular pores and few very fine tubular pores; about 25 percent, by volume, ironstone pebbles; about 2 percent, by volume, plinthite; few fine ironstone nodules; noneffervescent; strongly acid; clear wavy boundary.

Bo3—40 to 52 inches; red (2.5YR 4/8) gravelly sandy loam; weak very fine and fine subangular blocky structure; slightly hard, firm, slightly sticky, slightly plastic; few continuous faint ferriargillans on faces of peds; few very fine and fine roots; common very fine and fine irregular and few very fine tubular pores; about 27 percent, by volume, ironstone pebbles; noneffervescent; moderately acid; clear wavy boundary.

Bo4—52 to 80 inches; yellowish red (5YR 4/6) gravelly sandy clay loam; weak very fine and fine subangular blocky structure; slightly hard, firm, slightly sticky, slightly plastic; few very fine and fine roots; common very fine and fine irregular and few fine tubular pores; about 33 percent, by volume, ironstone pebbles; noneffervescent; moderately acid.

Range in Characteristics

Thickness of the solum: More than 80 inches

Content of ironstone pebbles: Less than 35 percent, by volume, throughout

Reaction: Very strongly acid to moderately acid throughout

Oi horizon:

Color—hue of 5YR to 10YR, value of 2 or 2.5, and chroma of 1 or 2

Texture—mucky peat

A horizon:

Color—hue of 10R to 5YR, value of 3 or 4, and chroma of 2 or 3

Texture—clay or gravelly clay

Bo horizon:

Color—hue of 10R to 5YR, value of 3 or 4, and chroma of 3 to 8

Texture—sandy loam, sandy clay loam, clay loam, or their gravelly analogs

Cerro Mariquita Series

Depth class: Shallow

Drainage class: Well drained

Permeability: Moderate

Parent material: Residuum and colluvium that weathered from basalt, chert, and rhyolite

Landscape: Hills and mountains

Landform: Ridges, hillslopes, and mountain slopes

Commonly associated soils: Bermeja, Casabe, Llanos Costa, and Maguayo soils

Slope: 5 to 60 percent

Taxonomic class: Clayey, mixed, active, isohyperthermic, shallow Typic Haplargids

Typical Pedon

Cerro Mariquita gravelly clay loam in an area of Bermeja-Cerro Mariquita complex, 12 to 20 percent slopes; Sierra Bermeja Mountain Range; about 4.4 miles northwest of the community of La Parguera; about 0.6 mile northeast of Rancho Cabassa homestead, in naturalized pastureland; Cabo Rojo Municipality; USGS Parguera topographic quadrangle (1966); lat. 17 degrees 59 minutes 32 seconds N. and long. 67 degrees 6 minutes 45 seconds W.

Ap—0 to 2 inches; very dark brown (7.5YR 2.5/2) gravelly clay loam; moderate fine and medium granular structure; soft, friable, slightly sticky, slightly plastic; many fine roots; common fine interstitial pores; about 25 percent, by volume, pebbles and 2 percent cobbles; moderately alkaline; abrupt smooth boundary.

Bt—2 to 13 inches; dark reddish brown (5YR 3/4) extremely paragravelly clay; massive parting to weak fine subangular blocky structure; soft, friable, sticky, slightly plastic; few fine roots; common fine interstitial pores; few faint clay films on faces of peds and in pore linings; about 45 percent, by volume, parapebbles and 20 percent paracobbles; slightly acid; clear wavy boundary.

Cr—13 to 23 inches; highly fractured, unconsolidated chert; abrupt wavy boundary.

R—23 inches; hard, consolidated chert bedrock.

Range in Characteristics

Thickness of the solum: 11 to 18 inches

Depth to bedrock: 11 to 18 inches to fractured, unconsolidated bedrock and 15 to 25 inches to hard, consolidated bedrock

Content (by volume) and size of rock fragments: 20 to 55 percent pebbles and cobbles in the A or Ap horizon and 25 to 65 percent parapebbles and paracobbles in the Bt horizon

Reaction: Slightly acid to moderately alkaline throughout

A or Ap horizon:

Color—hue of 5YR to 10YR, value of 2.5 to 4, and chroma of 2 to 4

Texture—clay loam, clay, or their gravelly analogs

Bt horizon:

Color—hue of 2.5YR or 5YR, value of 3 to 6, and chroma of 4 to 8

Texture—clay

BC horizon (where present):

Color—hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8

Texture—clay loam or gravelly clay loam

Cr layer:

Type of bedrock—unconsolidated basalt, chert, or rhyolite that can be excavated with difficulty using hand tools and is rippable by mechanical equipment

R layer:

Type of bedrock—hard, consolidated basalt, chert, or rhyolite bedrock

Chiquito Series

Depth class: Shallow

Drainage class: Well drained

Permeability: Moderate

Parent material: Residuum that weathered from mudstone

Landscape: Mountain ranges

Landform: Ridges and mountain slopes

Commonly associated soils: Agüeybaná, Cuchillas, Maricao, and Rubias soils

Slope: 40 to 90 percent

Taxonomic class: Clayey-skeletal, mixed, active, isothermic Lithic Eutrudepts

Typical Pedon

Chiquito gravelly clay loam in an area of Rubias-Chiquito complex, 60 to 90 percent slopes; about 4.1 miles southwest from the community of Castañer from the intersection of Puerto Rico Highways 135 and 374; about 0.4 mile southwest of Hacienda Las Piñas homestead, in a coffee plantation; Yauco Municipality; USGS Monte Guilarte topographic quadrangle (1960); lat. 18 degrees 7 minutes 51 seconds N. and long. 66 degrees 52 minutes 4 seconds W.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) gravelly clay loam; strong very fine and fine granular structure; hard, firm, slightly sticky, moderately plastic; many very fine and fine roots; many fine and medium interstitial pores; about 18 percent, by volume, pebbles and 2 percent parapebbles; neutral; gradual wavy boundary.

Bw1—5 to 11 inches; brown (10YR 4/3) very gravelly clay loam; moderate very fine and fine subangular blocky structure; hard, firm, slightly sticky, moderately plastic; many very fine and fine roots; common fine and medium irregular and few fine and medium interstitial pores; about 35 percent, by volume, pebbles and 5 percent parapebbles; neutral; clear wavy boundary.

Bw2—11 to 18 inches; very dark grayish brown (10YR 3/2) extremely gravelly clay loam; weak very fine and fine subangular blocky structure; slightly hard, friable, slightly sticky, moderately plastic; many very fine and fine roots; common fine and medium interstitial and few fine and medium irregular pores; about 50 percent, by volume, pebbles and 10 percent parapebbles; neutral; abrupt wavy boundary.

R—18 inches; hard, fractured, consolidated mudstone.

Range in Characteristics

Thickness of the solum: 8 to 13 inches

Depth to bedrock: 14 to 19 inches

Content (by volume) and size of rock fragments: 15 to 35 percent pebbles in the A horizon and more than 35 percent pebbles in the Bw horizon

Reaction: Slightly acid or neutral throughout, except where the surface has been limed

A or Ap horizon:

Color—hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 to 4

Texture—clay loam or gravelly clay loam

Bw horizon:

Color—hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 1 to 3

Texture—clay loam or its gravelly to extremely gravelly or paragravelly analogs

R layer:

Type of bedrock—hard, fractured, consolidated mudstone

Coamo Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderate

Parent material: Mixed alluvium that weathered from limestone and volcanic rocks

Landscape: Coastal plains

Landform: Alluvial fans

Commonly associated soils: Guanábano, Jácana, and Pozo Blanco soils

Slope: 2 to 5 percent

Taxonomic class: Fine, mixed, superactive, isohyperthermic Typic Argiustolls

Typical Pedon

Coamo clay loam, 2 to 5 percent slopes; about 0.3 mile northwest along a paved road from the range control office; about 50 feet west of the road at the Camp Santiago Army National Guard Base; Salinas Municipality; USGS Coamo topographic quadrangle (1972); lat. 18 degrees 0 minutes 23 seconds N. and long. 66 degrees 18 minutes 2 seconds W.

Ap—0 to 9 inches; black (10YR 2/1) clay loam, very dark grayish brown (10YR 3/2) dry; moderate fine and medium subangular blocky structure; hard, friable, slightly sticky, plastic; many very fine and fine roots; many very fine and fine tubular and interstitial pores; about 2 percent, by volume, pebbles; slightly alkaline; clear smooth boundary.

Bt1—9 to 14 inches; very dark grayish brown (10YR 3/2) clay loam, dark brown (10YR 3/3) dry; strong medium angular blocky structure; hard, friable, sticky, plastic; few very fine and fine roots; common very fine and fine tubular and interstitial pores; common distinct clay films on faces of peds and coarse fragments; about 2 percent, by volume, pebbles; slightly alkaline; clear smooth boundary.

Bt2—14 to 23 inches; dark brown (10YR 3/3) clay loam, brown (10YR 4/3) dry; strong medium angular blocky structure; hard, firm, sticky, plastic; few very fine and fine roots; common very fine tubular and interstitial pores; many prominent clay films on faces of peds and coarse fragments; about 10 percent, by volume, pebbles; slightly alkaline; gradual smooth boundary.

Btk1—23 to 38 inches; dark yellowish brown (10YR 4/4) sandy clay loam, brownish yellow (10YR 6/6) dry; strong medium angular blocky structure; hard, firm, sticky, plastic; few very fine roots; common very fine and fine tubular and interstitial pores; common distinct discontinuous clay films on faces of peds and coarse fragments; common fine to medium prominent white (10YR 8/1) soft masses of calcium carbonate; about 10 percent, by volume, pebbles; moderately alkaline; clear smooth boundary.

Btk2—38 to 50 inches; dark yellowish brown (10YR 4/6) clay loam, light yellowish brown (10YR 6/4) dry; moderate very fine and fine subangular blocky structure; slightly hard, friable, slightly sticky, plastic; few very fine roots; common very fine and fine tubular and interstitial and few medium tubular pores; few faint clay films on faces of peds; many fine to coarse prominent white (10YR 8/1) soft masses of calcium carbonate and few fine calcium carbonate nodules; about 10 percent, by volume, pebbles; moderately alkaline; clear smooth boundary.

2C—50 to 80 inches; brown (10YR 4/3) gravelly sandy loam, yellowish brown (10YR 5/4) dry; massive; slightly hard, very friable, slightly sticky, slightly plastic; few fine coatings of calcium carbonate on coarse fragments; about 20 percent, by volume, pebbles; moderately alkaline.

Range in Characteristics

Thickness of the solum: 24 to 50 inches

Content (by volume) and size of rock fragments: 0 to less than 15 percent pebbles in the A and Bt horizons, 0 to 25 percent pebbles in the Btk horizon, and 30 to 70 percent pebbles in the C horizon

Reaction: Slightly acid to slightly alkaline in the A or Ap horizon, slightly alkaline or moderately alkaline in the Bt horizon, and moderately alkaline in the Btk and C horizons

A or Ap horizon:

Color—hue of 10YR, value of 2 or 3, and chroma of 1 to 3

Texture—clay loam

Bt horizon (where present):

Color—hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4

Texture—clay loam or clay

Btk horizon:

Color—hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6

Texture—sandy clay loam, clay loam, clay, or their gravelly analogs

C or 2C horizon:

Color—hue of 10YR, value of 4 or 5, and chroma of 3 or 4

Texture—sandy loam, sandy clay loam, clay loam, or their gravelly analogs

Coloso Series

Depth class: Very deep

Drainage class: Somewhat poorly drained

Permeability: Slow

Parent material: Stratified loamy and clayey alluvial deposits

Landscape: River valleys

Landform: Flood plains

Commonly associated soils: Bajura, Dique, Lares, Mabí, Maní, Montegrande, Reilly, and Toa soils

Slope: 0 to 2 percent

Taxonomic class: Fine, mixed, active, isohyperthermic Vertic Dystrudepts

Typical Pedon

Coloso clay, 0 to 2 percent slopes, occasionally flooded; about 5.2 miles northwest from downtown San Germán; about 1.1 miles northwest of the community of Margarita from the intersection of Puerto Rico Highways 102 and 310; about 400 feet northwest from a dirt road, in an abandoned sugarcane field; Cabo Rojo Municipality; USGS San

Germán topographic quadrangle (1966); lat. 18 degrees 5 minutes 51 seconds N. and long. 67 degrees 7 minutes 19 seconds W.

- Ap—0 to 11 inches; dark gray (10YR 4/1) clay; strong fine and medium subangular blocky structure; very hard, very firm, slightly sticky, moderately plastic; many fine and medium pressure faces on surfaces of peds; slightly alkaline; gradual wavy boundary.
- Bw1—11 to 21 inches; dark grayish brown (10YR 4/2) clay; moderate fine and medium subangular blocky structure; hard, firm, slightly sticky, moderately plastic; many fine and medium pressure faces on surfaces of peds; few very fine and fine black (10YR 2/1) spherical iron-manganese nodules; slightly alkaline; gradual wavy boundary.
- Bw2—21 to 31 inches; dark grayish brown (10YR 4/2) clay; weak fine and medium subangular blocky structure; hard, firm, slightly sticky, moderately plastic; common fine and medium pressure faces on surfaces of peds; many very fine and fine black (10YR 2/1) spherical iron-manganese nodules; common fine yellowish brown (10YR 5/8) masses of iron accumulation; slightly alkaline; abrupt smooth boundary.
- C1—31 to 46 inches; light olive brown (2.5Y 5/4) clay; massive; hard, firm, slightly sticky, moderately plastic; few fine and medium pressure faces on surfaces of peds; few very fine and fine black (10YR 2/1) spherical iron-manganese nodules; common fine yellowish brown (10YR 5/8) masses of iron accumulation; common fine and medium prominent greenish gray (5GY 6/1) iron depletions; slightly alkaline; clear smooth boundary.
- C2—46 to 59 inches; pale olive (5Y 6/3) clay; massive; hard, firm, slightly sticky, moderately plastic; few very fine and fine black (10YR 2/1) spherical iron-manganese nodules; few fine yellowish brown (10YR 5/8) and olive yellow (2.5Y 6/6) masses of iron accumulation and greenish gray (5GY 6/1) iron depletions; slightly alkaline; abrupt smooth boundary.
- C3—59 to 75 inches; pale olive (5Y 6/3) clay; massive; hard, firm, slightly sticky, moderately plastic; common very fine and fine black (10YR 2/1) spherical iron-manganese nodules; few fine dark yellowish brown (10YR 4/6) masses of iron accumulation; common fine and medium prominent light greenish gray (5GY 7/1) and grayish brown (10YR 5/2) iron depletions; slightly alkaline; abrupt smooth boundary.
- Cg—75 to 90 inches; grayish brown (2.5Y 5/2) clay; hard, firm, slightly sticky, moderately plastic; many very fine and fine black (10YR 2/1) spherical iron-manganese nodules; few fine yellowish brown (10YR 5/6) and light yellowish brown (2.5Y 6/3) masses of iron accumulation; common medium prominent greenish gray (10Y 6/1) iron depletions; slightly alkaline.

Range in Characteristics

Thickness of the solum: 19 to 45 inches

Reaction: Moderately acid to slightly alkaline throughout

A or Ap horizon:

Color—hue of 7.5YR to 5Y, value of 2.5 to 4, and chroma of 1 to 4

Texture—clay

Redoximorphic features—none to common masses of iron accumulation in shades of brown and yellow

AB horizon (where present):

Color—hue of 10YR, value of 3, and chroma of 1 to 4

Texture—clay

Redoximorphic features—few to many masses of iron accumulation in shades of brown

Bw horizon:

Color—hue of 7.5YR to 5Y, value of 2.5 to 4, and chroma of 1 to 3; or neutral in hue, value of 2.5, and chroma of 1

Texture—clay loam or clay

Redoximorphic features—few to many masses of iron accumulation in shades of brown

C and Cg horizon:

Color—hue of 2.5Y to 5G, value of 3 to 6, and chroma of 1 to 4

Texture—clay loam or clay

Redoximorphic features—few to many iron depletions in shades of gray and few to many masses of iron accumulation in shades of red, brown, or yellow

Consumo Series

Depth class: Very deep

Drainage class: Moderately well drained

Permeability: Moderate

Parent material: Residuum that weathered from basic volcanic bedrock

Landscape: Hills and mountains

Landform: Hillslopes and mountain slopes

Commonly associated soils: Caguabo, Humatas, Morado, Múcara, and Quebrada soils

Slope: 20 to 60 percent

Taxonomic class: Fine, mixed, semiactive, isohyperthermic Typic Haplohumults

Typical Pedon

Consumo clay, 20 to 40 percent slopes (fig. 23); Sabana Alta Mountain Range; about 2.2 miles north of downtown Cabo Rojo from the intersection of Puerto Rico Highways 102 and 312; about 0.9 mile northeast from the community of Sabana Alta; about 600 feet north of a paved road, in naturalized pastureland; Cabo Rojo Municipality; USGS Puerto Real topographic quadrangle (1966); lat. 18 degrees 7 minutes 20 seconds N. and long. 67 degrees 8 minutes 27 seconds W.

Ap—0 to 5 inches; strong brown (7.5YR 4/6) clay; strong very fine and fine granular structure; hard, firm, slightly sticky, plastic; common distinct pressure faces on surfaces of peds; common very fine and fine roots; many fine interstitial pores; moderately acid; gradual smooth boundary.

Bt1—5 to 11 inches; yellowish red (5YR 4/6) clay; moderate very fine and fine granular structure parting to weak fine subangular blocky structure; hard, firm, slightly sticky, plastic; common prominent clay films on faces of peds; few very fine and fine roots; common fine interstitial pores; strongly acid; gradual smooth boundary.

Bt2—11 to 20 inches; yellowish red (5YR 4/6) clay; strong fine and medium subangular blocky structure; slightly hard, firm, slightly sticky, plastic; many prominent clay films on faces of peds; few fine roots; few fine tubular and common fine interstitial pores; few fine and medium prominent dark red (10R 3/6) masses of iron accumulation; strongly acid; abrupt wavy boundary.

C—20 to 80 inches; 55 percent red (2.5YR 4/6), 35 percent brownish yellow (10YR 6/8), and 10 percent very pale brown (10YR 8/2) saprolite having a texture of silty clay loam, in a variegated pattern; massive; slightly hard, friable, slightly sticky, slightly plastic; few fine roots; few fine tubular and common fine interstitial pores; strongly acid.

Range in Characteristics

Thickness of the solum: 10 to 38 inches

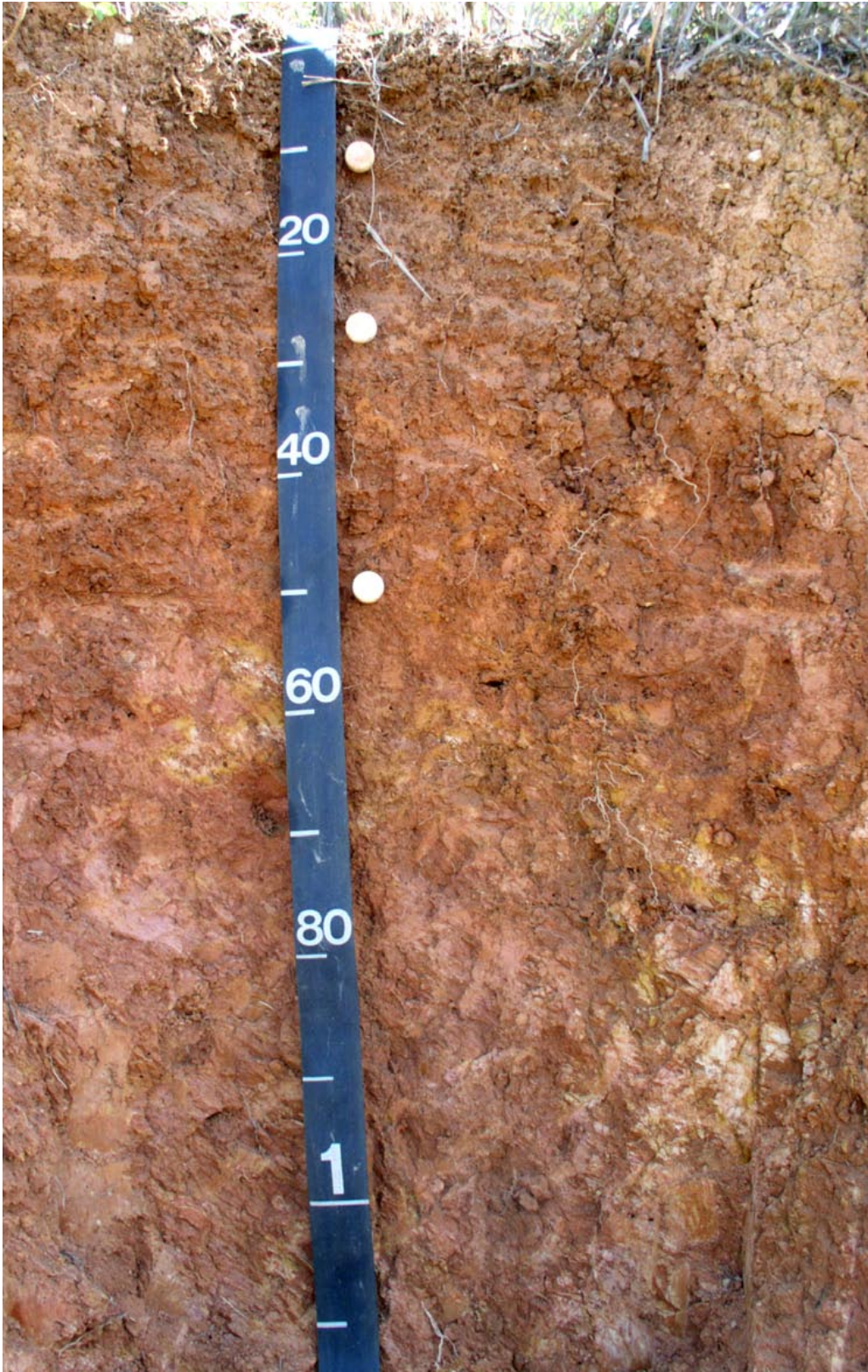


Figure 23.—Profile of Consumo clay, 20 to 40 percent slopes. Consumo soils are characterized by surface and subsurface layers of clay over saprolite. They are in the udic soil moisture regime.

Content (by volume) and size of rock fragments: Less than 10 percent pebbles throughout

Reaction: Slightly acid to very strongly acid throughout

A or Ap horizon:

Color—hue of 5YR to 10YR, value of 4, and chroma of 6

Texture—clay loam or clay

Bt horizon:

Color—hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8

Texture—silty clay or clay

BC horizon (where present):

Color—hue of 5YR to 10YR, value of 4 or 5, and chroma of 6 to 8

Texture—silty clay loam or clay loam

C horizon:

Color—no dominant color and multicolored in shades of red, brown, and yellow

Texture—loam, silty clay loam, or clay loam

Cortada Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderate

Parent material: Stratified alluvial deposits

Landscape: River valleys

Landform: Flood plains

Commonly associated soils: La Luna, San Antón, and Vayas soils

Slope: 0 to 2 percent

Taxonomic class: Fine, smectitic, isohyperthermic Cumulic Haplustolls

Typical Pedon

Cortada silty clay loam, 0 to 2 percent slopes, occasionally flooded; about 1.7 miles northwest from the intersection of Puerto Rico Highways 116 and 389; about 800 feet northwest from Puerto Rico Highway 332 on a gravel road; about 100 feet northeast from the gravel road in a sorghum plantation; Guánica Municipality; USGS Sabana Grande topographic quadrangle (1966); lat. 18 degrees 0 minutes 50 seconds N. and long. 66 degrees 54 minutes 36 seconds W.

Ap—0 to 6 inches; very dark gray (10YR 3/1) silty clay loam; strong fine and medium granular structure; very hard, very firm, nonsticky, moderately plastic; many fine roots; common fine and medium interstitial pores; slightly alkaline.

AB—6 to 15 inches; very dark brown (10YR 2/2) silty clay loam; moderate fine subangular blocky structure; very hard, very firm, nonsticky, moderately plastic; common fine roots; common fine and medium irregular pores; noneffervescent; slightly alkaline.

Bk1—15 to 23 inches; very dark grayish brown (10YR 3/2) silty clay loam; moderate fine subangular blocky structure; hard, firm, nonsticky, moderately plastic; common fine roots; common fine and medium irregular pores; few fine very pale brown (10YR 8/2) masses of calcium carbonate; strongly effervescent; moderately alkaline.

Bk2—23 to 34 inches; very dark grayish brown (2.5Y 3/2) clay loam; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, moderately plastic; few fine roots; few fine irregular pores; about 8 percent, by volume, pebbles; few fine very pale brown (10YR 8/2) masses of calcium carbonate; strongly effervescent; moderately alkaline.

Bk3—34 to 45 inches; very dark grayish brown (2.5Y 3/2) sandy clay loam; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, moderately plastic; few fine roots; few fine irregular pores; about 2 percent, by volume, pebbles; common fine very pale brown (10YR 8/2) masses of calcium carbonate; strongly effervescent; moderately alkaline.

C1—45 to 56 inches; dark gray (2.5Y 4/1) sandy loam; massive; soft, very friable, nonsticky, nonplastic; about 2 percent, by volume, pebbles; strongly effervescent; moderately alkaline.

C2—56 to 63 inches; dark gray (2.5Y 4/1) loam; massive; soft, friable, nonsticky, moderately plastic; about 5 percent, by volume, pebbles; strongly effervescent; moderately alkaline.

2C—63 to 80 inches; dark gray (10YR 4/1) gravelly sandy clay loam; massive; soft, very friable, nonsticky, slightly plastic; about 20 percent, by volume, pebbles; strongly effervescent; moderately alkaline.

Range in Characteristics

Thickness of the solum: 29 to 60 inches

Content (by volume) and size of rock fragments: 0 to less than 15 percent pebbles in the A and B horizons and 0 to less than 35 percent pebbles in the C horizons

Reaction: Slightly alkaline in the A or Ap horizon and moderately alkaline in the B and C horizons

A or Ap horizon:

Color—hue of 10YR, value of 2 to 3, and chroma of 1 to 3

Texture—clay loam or silty clay loam

AB horizon (where present):

Color—hue of 10YR, value of 2 or 3, and chroma of 1 to 3

Texture—clay loam or silty clay loam

Bk horizon:

Color—hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 3 or 4

Texture—sandy clay loam, clay loam, silty clay loam, or silty clay

Calcium carbonate—common or many soft masses of concentrations

Bt horizon (where present):

Color—hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 3 or 4

Texture—sandy clay loam, clay loam, silty clay loam, silty clay, or clay

Calcium carbonate—none to few soft masses of concentrations

C horizon:

Color—hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 1 to 3

Texture—sandy loam, loam, clay loam, or their gravelly analogs

2C horizon (where present):

Color—hue of 10YR, value of 4 or 5, and chroma of 1 or 2

Texture—sandy clay loam or gravelly sandy clay loam

Costa Series

Depth class: Shallow

Drainage class: Well drained

Permeability: Very slow

Parent material: Material that weathered from limestone bedrock

Landscape: Hills

Landform: Ridges and hillslopes

Commonly associated soils: Altamira, Casabe, El Papayo, Guayacán, La Covana, Montalva, Pitahaya, and Seboruco soils

Slope: 5 to 60 percent

Taxonomic class: Clayey, carbonatic, isohyperthermic, shallow Typic Torriorthents

Typical Pedon

Costa very gravelly clay in an area of Costa-Pitahaya complex, 20 to 60 percent slopes; about 3.0 miles west of the community of La Parguera; about 1.8 miles southeast of Rancho Cabassa; about 100 feet north of a gravel road, in naturalized pastureland; Lajas Municipality; USGS Parguera topographic quadrangle (1966); lat. 17 degrees 58 minutes 40 seconds N. and long. 67 degrees 5 minutes 35 seconds W.

Ap—0 to 7 inches; dark yellowish brown (10YR 4/4) very gravelly clay; moderate medium granular structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine to medium roots; many very fine and common fine interstitial pores; about 30 percent, by volume, pebbles, 15 percent cobbles, and 2 percent stones; strongly effervescent; moderately alkaline; clear wavy boundary.

AC—7 to 11 inches; dark yellowish brown (10YR 4/4) very gravelly clay; weak medium granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine to medium roots; many very fine and fine tubular and vesicular pores; about 25 percent, by volume, pebbles; common hard calcium carbonate concretions; common distinct soft masses of calcium carbonate; strongly effervescent; moderately alkaline; clear wavy boundary.

C—11 to 19 inches; light yellowish brown (10YR 6/4) silty clay; massive; soft, very friable, moderately sticky, moderately plastic; common fine and medium and few coarse roots; many very fine and fine tubular and vesicular pores; about 10 percent, by volume, pebbles; violently effervescent; moderately alkaline; clear wavy boundary.

Cr1—19 to 27 inches; light yellowish brown (10YR 6/4), soft, semiconsolidated, fractured limestone that has a texture of silty clay; moderate medium and thick platy rock structure; few fine and common medium roots in fracture planes; common continuous secondary calcite coatings on fracture planes; violently effervescent; moderately alkaline; clear wavy boundary.

Cr2—27 to 43 inches; 75 percent yellow (10YR 7/6) and 25 percent very pale brown (10YR 8/4), soft, semiconsolidated, fractured limestone that has a texture of loam; moderate medium and thick platy rock structure; common very fine, fine, and medium roots in fracture planes; common distinct secondary calcite coatings on fracture planes; violently effervescent; strongly alkaline; clear wavy boundary.

R—43 to 63 inches; very pale brown (10YR 8/2), consolidated limestone bedrock; strong thick platy rock structure; few fine and medium roots in fracture planes; violently effervescent; strongly alkaline.

Range in Characteristics

Thickness of the solum: 10 to 20 inches

Depth to semiconsolidated bedrock: 10 to 20 inches

Depth to bedrock: 30 to 45 inches

Content (by volume) and size of rock fragments: 15 to 60 percent, mainly pebbles and cobbles, in the A horizon; 15 to 35 percent, mainly pebbles and cobbles, in the AC horizon, where present; and 5 to 50 percent, mainly pebbles and cobbles, in the C horizon

Reaction: Slightly alkaline or moderately alkaline throughout

A or Ap horizon:

Color—hue of 10YR, value of 2 to 5, and chroma of 2 to 4

Texture—clay loam, clay, or their gravelly or very gravelly analogs

AC horizon (where present):

Color—hue of 10YR, value of 3 to 5, and chroma of 3 or 4

Texture—clay loam, clay, or their gravelly analogs

C horizon:

Color—hue of 7.5YR or 10YR, value of 5 to 8, and chroma of 2 to 8

Texture—clay loam, silty clay, clay, or their gravelly or very gravelly analogs

Cr horizon:

Color—hue of 7.5YR to 2.5Y, value of 5 to 8, and chroma of 1 to 8

Type of bedrock—soft, semiconsolidated and consolidated, fractured limestone that can be excavated with difficulty using hand tools and is rippable by mechanical equipment

R layer:

Type of bedrock—soft, unweathered limestone bedrock

Cuchillas Series

Depth class: Moderately deep

Drainage class: Well drained

Permeability: Moderate

Parent material: Residuum that weathered from volcanic rocks

Landscape: Mountain ranges

Landform: Ridges and mountain slopes

Commonly associated soils: Agüeybaná, Chiquito, Maricao, and Rubias soils

Slope: 20 to 90 percent

Taxonomic class: Loamy, mixed, active, isothermic, shallow Typic Dystrudepts

Typical Pedon

Cuchillas silty clay loam, 20 to 60 percent slopes; about 2.0 miles southwest of the community of Castañer from the intersection of Puerto Rico Highways 135 and 374; about 250 feet north of Hacienda La Salvación homestead, in a coffee plantation; Yauco Municipality; USGS Monte Guilarte topographic quadrangle (1960); lat. 18 degrees 9 minutes 25 seconds N. and long. 67 degrees 5 minutes 21 seconds W.

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) silty clay loam; moderate fine granular structure; soft, friable, slightly sticky, slightly plastic; many very fine to medium roots; common fine interstitial pores; about 5 percent, by volume, weathered rock fragments 0.25 to 0.50 inch in diameter; neutral; clear smooth boundary.

Bw—6 to 15 inches; dark grayish brown (10YR 4/2) silty clay loam; weak fine subangular blocky structure; soft, friable, slightly sticky, slightly plastic; few fine roots; common fine interstitial pores; about 10 percent, by volume, partially weathered rock fragments 0.25 to 0.50 inch in diameter; noneffervescent; neutral; abrupt wavy boundary.

Cr—15 to 36 inches; highly fractured, unconsolidated volcanic rock; few fine and medium roots between fracture planes; clear wavy boundary.

R—36 inches; hard fractured consolidated volcanic bedrock.

Range in Characteristics

Thickness of the solum: 6 to 20 inches

Depth to fractured bedrock: 15 to 28 inches

Depth to bedrock: 28 to 36 inches

Content (by volume) and size of rock fragments: Less than 35 percent pebbles throughout

Reaction: Slightly acid or neutral throughout, except where the surface has been limed

A or Ap horizon:

Color—hue of 10YR, value of 3 or 4, and chroma of 2

Texture—silty clay loam or gravelly silty clay loam

Bw horizon:

Color—hue of 10YR, value of 3 or 4, and chroma of 2 to 4

Texture—silty clay loam, silty clay, or their gravelly analogs

Cr horizon:

Type of bedrock—unconsolidated, fractured volcanic rock that can be excavated with difficulty using hand tools and is rippable by mechanical equipment

R layer:

Type of bedrock—hard, fractured, consolidated volcanic bedrock

Delicias Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderate

Parent material: Fine textured colluvium and residuum that weathered from serpentinite bedrock

Landscape: Uplands

Landform: Alluvial fans

Commonly associated soils: Guanajibo, Nipe, Rosario, and Voladora soils

Slope: 5 to 20 percent

Taxonomic class: Fine, ferruginous, isohyperthermic Rhodic Hapludox

Typical Pedon

Delicias clay, 5 to 20 percent slopes; about 200 feet west from the intersection of Puerto Rico Highway 100 and Los Americanos Road; about 25 feet north of the road, in naturalized pastureland; Cabo Rojo Municipality; USGS Mayagüez topographic quadrangle (1964); lat. 18 degrees 7 minutes 40 seconds N. and long. 67 degrees 9 minutes 37 seconds W.

Ap—0 to 6 inches; dark reddish brown (2.5YR 3/4) clay; strong fine granular structure; friable, slightly sticky, plastic; common fine and few medium roots; common fine interstitial and few fine tubular pores; about 15 percent, by volume, ironstone pebbles; strongly acid; clear wavy boundary.

Bo1—6 to 14 inches; dark reddish brown (2.5YR 3/4) gravelly clay; moderate fine subangular blocky structure; friable, slightly sticky, plastic; common faint clay films on faces of peds; common fine and few medium roots; common fine interstitial and few fine tubular pores; about 25 percent, by volume, ironstone pebbles; strongly acid; clear smooth boundary.

Bo2—14 to 21 inches; dark reddish brown (2.5YR 3/4) gravelly clay; moderate fine subangular blocky structure; friable, slightly sticky, plastic; common faint clay films on faces of peds; common fine and few coarse roots; common fine interstitial and few fine tubular pores; about 25 percent, by volume, ironstone pebbles; strongly acid; clear wavy boundary.

Bo3—21 to 36 inches; dark reddish brown (2.5YR 3/4) very gravelly clay; weak fine subangular blocky structure; friable, slightly sticky, plastic; common distinct clay films on faces of peds; common fine roots; common fine interstitial and few fine tubular pores; about 40 percent, by volume, ironstone pebbles; strongly acid; clear smooth boundary.

Bo4—36 to 47 inches; dark red (2.5YR 3/6) gravelly clay; weak fine subangular blocky structure; friable, slightly sticky, plastic; common prominent clay films on faces of

pedes; common fine roots; common fine interstitial and few fine tubular pores; about 25 percent, by volume, ironstone pebbles; strongly acid; clear wavy boundary.
Bo5—47 to 68 inches; dark red (2.5YR 3/6) clay; weak fine subangular blocky structure; friable, slightly sticky, plastic; common prominent clay films on faces of pedes; common fine tubular and few medium interstitial pores; about 25 percent, by volume, ironstone pebbles; very strongly acid.

Range in Characteristics

Thickness of the solum: More than 80 inches

Content (by volume) and size of rock fragments: 0 to 35 percent ironstone pebbles in the Ap horizon and 5 to 50 percent ironstone pebbles in the Bo horizon

Reaction: Strongly acid or very strongly acid throughout, except where the surface has been limed

Ap horizon:

Color—hue of 2.5YR or 5YR, value of 3, and chroma of 3 or 4

Texture—clay or gravelly clay

Bo horizon (upper part):

Color—hue of 10R to 5YR, value of 3, and chroma of 4 to 6

Texture—clay, gravelly clay, or very gravelly clay

Bo horizon (lower part):

Color—hue of 10R or 2.5YR, value of 3, and chroma of 3 to 6

Texture—clay, gravelly clay, or very gravelly clay

Descalabrado Series

Depth class: Shallow

Drainage class: Well drained

Permeability: Moderate

Parent material: Residuum and colluvium that weathered from basic volcanic rock

Landscape: Hills

Landform: Hillslopes

Commonly associated soils: Aguilita, Duey, Guanábano, Jácana, Mariana, Pozo Blanco, and San Germán soils

Slope: 2 to 60 percent

Taxonomic class: Clayey, mixed, superactive, isohyperthermic, shallow Typic Haplustolls

Typical Pedon

Descalabrado clay, 20 to 60 percent slopes; about 3.0 miles southwest of downtown Sabana Grande from the intersection of Puerto Rico Highways 120 and 364; about 0.3 mile north from the intersection of Puerto Rico Highways 117 and 328; about 400 feet west of Puerto Rico Highway 328, in pastureland; Lajas Municipality; USGS Sabana Grande topographic quadrangle (1966); lat. 18 degrees 2 minutes 39 seconds N. and long. 66 degrees 59 minutes 0 seconds W.

Ap—0 to 5 inches; dark brown (10YR 3/3) clay; weak fine subangular blocky structure parting to moderate medium granular; slightly hard, friable, slightly sticky, slightly plastic; many fine roots; about 12 percent, by volume, angular pebbles; neutral; clear smooth boundary.

Bw—5 to 10 inches; dark brown (7.5YR 3/2) clay; weak fine subangular blocky structure; slightly hard, firm, slightly sticky, slightly plastic; few fine roots; about 12 percent, by volume, angular pebbles; neutral; irregular wavy boundary.

Cr—10 to 18 inches; highly fractured, unconsolidated volcanic rock.

R—18 inches; hard, consolidated volcanic bedrock.

Range in Characteristics

Thickness of the solum: 4 to 12 inches

Depth to bedrock: Less than 20 inches

Content (by volume) and size of rock fragments: Less than 35 percent in the A and Bw horizons; mostly pebbles; cobbles in a few places

Reaction: Slightly acid or neutral throughout

A or Ap horizon:

Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3

Texture—clay loam, clay, or their gravelly or cobbly analogs

Bw horizon:

Color—hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2

Texture—clay loam, clay, or their gravelly or cobbly analogs

C horizon (where present):

Color—hue of 10YR, value of 3, and chroma of 3

Texture—loamy sand, gravelly loamy sand, or cobbly loamy sand

Cr layer:

Type of bedrock—highly fractured, unconsolidated volcanic rock that can be excavated with difficulty using hand tools and is rippable by mechanical equipment

R layer:

Type of bedrock—hard, consolidated, basic volcanic rock

Dique Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderate

Parent material: Alluvial deposits of mixed origin

Landscape: River valleys

Landform: Flood plains

Commonly associated soils: Bajura, Coloso, Maní, Reilly, and Toa soils

Slope: 0 to 2 percent

Taxonomic class: Fine-loamy, mixed, active, isohyperthermic Fluventic Eutrudepts

Typical Pedon

Dique loam, 0 to 2 percent slopes, frequently flooded; about 1.5 miles northwest of the community of Sabana Eneas from the intersection of Puerto Rico Highways 102 and 317; about 1.1 miles south from Hacienda Julia; about 800 feet west of a dirt road, in pastureland; Hormigueros Municipality; USGS San Germán topographic quadrangle (1966); lat. 18 degrees 6 minutes 30 seconds N. and long. 67 degrees 5 minutes 21 seconds W.

Ap—0 to 12 inches; olive brown (2.5Y 4/3) loam; strong fine and medium subangular blocky structure; very hard, very firm, sticky, slightly plastic; neutral; clear wavy boundary.

Bw1—12 to 25 inches; olive brown (2.5Y 4/3) loam; moderate fine and medium subangular blocky structure; very hard, firm, sticky, slightly plastic; common faint pressure faces on surfaces of peds; slightly alkaline; clear wavy boundary.

Bw2—25 to 37 inches; olive brown (2.5Y 4/3) silt loam; weak fine and medium subangular blocky structure; slightly hard, firm, sticky, slightly plastic; common faint pressure faces on surfaces of peds; slightly alkaline; clear wavy boundary.

- C—37 to 56 inches; olive brown (2.5Y 4/3) loam; massive; slightly hard, friable, sticky, slightly plastic; common fine prominent yellowish red (5YR 4/6) soft masses of iron accumulation; slightly alkaline; abrupt wavy boundary.
- 2C—56 to 69 inches; very dark gray (10YR 3/1) clay; massive; slightly hard, friable, slightly sticky, plastic; common fine prominent yellowish red (5YR 4/6) soft masses of iron accumulation; slightly alkaline; abrupt wavy boundary.
- 3C—69 to 90 inches; 34 percent light olive brown (2.5Y 5/4), 33 percent dark grayish brown (2.5Y 4/2), and 33 percent gray (5Y 5/1) silty clay loam; massive; slightly hard, friable, slightly sticky, slightly plastic; the areas of light olive brown are masses of iron accumulation and the areas of dark grayish brown and gray are iron depletions; slightly alkaline.

Range in Characteristics

Thickness of the solum: 34 to 50 inches

Content (by volume) and size of rock fragments: 0 to less than 15 percent pebbles throughout

Reaction: Neutral or slightly alkaline throughout

A or Ap horizon:

Color—hue of 10YR or 2.5Y, value of 4, and chroma of 2 or 3

Texture—loam or silt loam

Bw horizon:

Color—hue of 10YR or 2.5Y, value of 4, and chroma of 2 to 4

Texture—loam, silt loam, or silty clay loam

C horizon:

Color—hue of 10YR or 2.5Y, value of 4, and chroma of 3 or 4

Texture—loam or sandy clay loam

2C horizon (where present):

Color—hue of 10YR or 2.5Y, value of 3, and chroma of 1 or 2

Texture—clay loam or clay

3C horizon (where present):

Color—hue of 10YR to 5Y, value of 3 to 5, and chroma of 1 to 6

Texture—silty clay loam, silty clay, or clay

Duey Series

Depth class: Shallow

Drainage class: Well drained

Permeability: Very slow

Parent material: Material that weathered from limestone bedrock from the Cretaceous Period

Landscape: Hills

Landform: Hillslopes

Commonly associated soils: Aguilita, Descalabrado, Pozo Blanco, and San Germán soils

Slope: 5 to 60 percent

Taxonomic class: Clayey-skeletal, mixed, superactive, isohyperthermic, shallow Typic Haplustolls

Typical Pedon

Duey gravelly clay loam (fig. 24) in an area of San Germán-Duey complex, 20 to 60 percent slopes; about 4.3 miles southwest of downtown Cabo Rojo from the intersection of Puerto Rico Highways 102 and 312; about 2.6 miles northwest of



Figure 24.—Profile of a Duey soil in an area of San Germán-Duey complex, 20 to 60 percent slopes. Duey soils are characterized by a surface layer of gravelly clay loam and a subsurface layer of extremely gravelly clay loam over soft, highly fractured, slightly weathered limestone bedrock. They are in the ustic soil moisture regime.

the community of Boquerón from the intersection of Puerto Rico Highways 100 and 101; about 0.4 mile west of Puerto Rico Highway 307; about 0.1 mile west of an old railroad track, in naturalized pastureland; Cabo Rojo Municipality; USGS Puerto Real topographic quadrangle (1966); lat. 18 degrees 2 minutes 47 seconds N. and long. 67 degrees 11 minutes 38 seconds W.

- Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) gravelly clay loam; strong very fine and fine granular structure; slightly hard, firm, slightly sticky, moderately plastic; many very fine and fine roots; many very fine and fine irregular pores; about 15 percent, by volume, pebbles; moderately alkaline; strongly effervescent; clear smooth boundary.
- A—8 to 13 inches; brown (10YR 4/3) very gravelly clay loam; moderate very fine and fine granular structure parting to weak fine subangular blocky; slightly hard, friable, slightly sticky, moderately plastic; many very fine, fine, and medium roots; many very fine and fine irregular pores; about 45 percent, by volume, pebbles and 2 percent cobbles; moderately alkaline; violently effervescent; clear smooth boundary.
- C—13 to 17 inches; yellowish brown (10YR 5/4) extremely gravelly clay loam; massive; soft, friable, moderately sticky, moderately plastic; common fine and medium roots; many very fine and fine irregular pores; about 80 percent, by volume, pebbles; moderately alkaline; violently effervescent; abrupt wavy boundary.
- Cr—17 to 35 inches; highly fractured limestone; few medium and coarse roots between rock fractures; abrupt irregular boundary.
- R—35 inches; hard, consolidated limestone bedrock.

Range in Characteristics

Thickness of the solum: 7 to 18 inches

Depth to consolidated bedrock: 30 to 55 inches

Content (by volume) and size of rock fragments: 10 to 60 percent pebbles in the Ap and A horizons; 15 to 40 percent pebbles in the AC horizon, where present; and 5 to 50 percent pebbles in the C horizon, where present

Reaction: Neutral to moderately alkaline in the Ap and A horizons and slightly alkaline or moderately alkaline in the AC and C horizons

Ap and A horizons:

Color—hue of 7.5YR or 10YR, value of 2 to 5, and chroma of 2 to 4

Texture in the fine-earth fraction—clay loam or clay

AC horizon (where present):

Color—hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 3 or 4

Texture in the fine-earth fraction—loam clay loam or clay

C horizon (where present):

Color—hue of 7.5YR or 10YR, value of 5 to 8, and chroma of 2 to 8

Texture in the fine-earth fraction—clay loam, silty clay, or clay

Cr horizon:

Type of bedrock—highly fractured limestone that can be excavated with difficulty using hand tools and is rippable by mechanical equipment

R layer:

Type of bedrock—consolidated, unweathered limestone bedrock

El Cacique Series

Depth class: Shallow

Drainage class: Well drained

Permeability: Moderately slow

Parent material: Colluvium and residuum that weathered from serpentinite bedrock

Landscape: Serpentine hills and mountains

Landform: Ridges, hillslopes, and mountain slopes

Commonly associated soils: La Taína, Maresúa, Nipe, Quebrada, Rosario, and Santa Marta soils

Slope: 5 to 90 percent

Taxonomic class: Clayey, magnesian, isohyperthermic, shallow Typic Argiudolls

Typical Pedon

El Cacique gravelly clay loam (fig. 25) in an area of El Cacique-La Taína complex, 20 to 60 percent slopes; about 1.5 miles northeast of downtown San Germán; about 0.25 mile northeast of the intersection of Puerto Rico Highways 2 and 362; about 400 feet north of Puerto Rico Highway 2, in pastureland; San Germán Municipality; USGS San Germán topographic quadrangle (1966); lat. 18 degrees 5 minutes 15 seconds N. and long. 67 degrees 1 minute 16 seconds W.

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) gravelly clay loam; moderate fine and medium granular structure; slightly hard, firm, slightly sticky, plastic; many very fine and common fine roots; common very fine and fine interstitial and vesicular pores; about 15 percent, by volume, pebbles and 2 percent cobbles; noneffervescent; neutral; abrupt smooth boundary.

Bt—6 to 11 inches; very dark grayish brown (10YR 3/2) very paragravelly clay; weak very fine and fine granular structure; soft, friable, slightly sticky, plastic; common very fine and fine roots; few very fine and fine interstitial pores; common distinct clay films on faces of peds; about 40 percent, by volume, parapebbles and 1 percent paracobbles; noneffervescent; neutral; abrupt smooth boundary.

Cr—11 to 14 inches; highly fractured serpentinite bedrock.

R—14 to 86 inches; hard, consolidated serpentinite bedrock.

Range in Characteristics

Thickness of the solum: 9 to 16 inches

Depth to bedrock: 9 to 20 inches

Content (by volume) and size of rock fragments: 5 to 40 percent pebbles in the A horizon and 15 to 40 percent parapebbles in the Bt horizon

Reaction: Neutral throughout

Ap horizon:

Color—hue of 7.5YR or 10YR, value of 3, and chroma of 1 to 3

Texture in the fine-earth fraction—clay loam or clay

Bt horizon:

Color—hue of 7.5YR or 10YR, value of 3, and chroma of 1 to 3

Texture in the fine-earth fraction—clay

Cr horizon:

Type of paralithic contact—highly fractured serpentinite that can be excavated with difficulty using hand tools and is rippable by mechanical equipment

R layer:

Type of bedrock—hard, consolidated serpentinite bedrock

El Descanso Series

Depth class: Shallow

Drainage class: Well drained

Permeability: Slow

Parent material: Residuum that weathered from serpentinite bedrock

Landscape: Serpentinite mountains

Landform: Ridges and mountain slopes

Commonly associated soils: Aljibe, Cerro Gordo, Guamá, Hoconuco, and Indiera soils

Slope: 5 to 90 percent

Taxonomic class: Clayey-skeletal, magnesian, isothermic Lithic Argiudolls



Figure 25.—Profile of an El Cacique soil in an area of El Cacique-La Taina complex, 20 to 60 percent slopes. El Cacique soils are characterized by a surface layer of gravelly clay loam and a subsurface layer of very paragravelly clay over hard, fractured, consolidated serpentinite bedrock. They are in the udic soil moisture regime.

Typical Pedon

El Descanso soil in an area of El Descanso-Hoconuco complex, 20 to 60 percent slopes; about 0.4 mile southwest from the headquarters of Maricao State Forest (Campamento Buena Vista); about 0.8 mile south from El Alto del Descanso Peak, in forestland; San Germán Municipality; USGS Maricao topographic quadrangle (1960); lat. 18 degrees 8 minutes 48 seconds N. and long. 66 degrees 59 minutes 45 seconds W.

Oi—0 to 3 inches; black (10YR 2/1) mucky peat; about 70 percent fiber crushed and rubbed; massive; very friable, nonsticky, nonplastic; many very fine, fine, medium, and coarse roots; about 10 percent, by volume, cobbles; slightly acid; clear wavy boundary.

A—3 to 8 inches; dark brown (7.5YR 3/2) very gravelly clay loam; strong very fine and fine granular structure; slightly hard, firm, slightly sticky, moderately plastic; many very fine, fine, medium, and coarse roots; many very fine, fine, and medium irregular pores; few faint pressure faces on peds; about 45 percent, by volume, angular pebbles; neutral; clear wavy boundary.

Bt—8 to 15 inches; dark brown (7.5YR 3/2) extremely paragravelly clay; moderate very fine and fine subangular blocky structure; hard, firm, slightly sticky, moderately plastic; many very fine and fine roots; many very fine and fine irregular pores; common distinct clay films on faces of peds and coarse fragments; about 70 percent, by volume, angular parapebbles and 5 percent angular paracobbles; neutral; abrupt irregular boundary.

R—15 inches; hard, fractured, consolidated serpentinite bedrock.

Range in Characteristics

Thickness of the solum: 6 to 12 inches

Depth to bedrock: 15 to 19 inches

Content (by volume) and size of rock fragments: 0 to less than 15 percent pebbles and cobbles in the Oi horizon, 10 to 45 percent pebbles and cobbles in the A horizon, and 36 to 75 percent parapebbles and paracobbles in the Bt horizon

Reaction: Slightly acid or neutral throughout

Oi horizon:

Color—hue of 10YR, value of 2 or 3, and chroma of 1 or 2

Texture—mucky peat

A horizon:

Color—hue of 7.5YR or 10YR, value of 3, and chroma of 2

Texture in the fine-earth fraction—clay loam or clay

Bt horizon:

Color—hue of 5YR to 10YR, value of 3, and chroma of 2 or 3

Texture in the fine-earth fraction—clay

R layer:

Type of bedrock—hard, fractured, consolidated serpentinite bedrock

El Papayo Series

Depth class: Shallow

Drainage class: Well drained

Permeability: Moderate

Parent material: Residuum and colluvium that weathered from basic volcanic rock

Landscape: Hills

Landform: Ridges and hillslopes

Commonly associated soils: Costa, Llanos Costa, Montalva, and Pitahaya soils

Slope: 2 to 60 percent

Taxonomic class: Clayey, mixed, superactive, isohyperthermic, shallow Typic Haplocambids

Typical Pedon

El Papayo gravelly clay loam, 2 to 12 percent slopes; about 1.7 miles southeast of the intersection of Puerto Rico Highways 304 and 324; about 0.2 mile south of Puerto Rico Highway 324 from the intersection of El Papayo and Fortuna salt-mine roads; about 200 feet west of a trail, in naturalized pastureland; Lajas Municipality; USGS Parguera topographic quadrangle (1966); lat. 17 degrees 58 minutes 34 seconds N. and long. 67 degrees 1 minute 9 seconds W.

Ap—0 to 2 inches; dark brown (7.5YR 3/2) gravelly clay loam; moderate medium granular structure; soft, very friable, slightly sticky, plastic; common very fine roots; many very fine irregular pores; about 25 percent, by volume, pebbles; neutral; clear smooth boundary.

Bw—2 to 14 inches; dark brown (7.5YR 3/2) clay; strong medium subangular blocky structure; hard, firm, sticky, plastic; common fine roots; common very fine irregular and tubular pores; about 5 percent, by volume, angular pebbles; neutral; abrupt smooth boundary.

Cr—14 to 16 inches; highly fractured, unconsolidated andesite rock.

R—16 inches; hard, consolidated andesite bedrock.

Range in Characteristics

Thickness of the solum: 6 to 16 inches

Depth to bedrock: 7 to 17 inches fractured, unconsolidated andesite rock and 12 to 25 inches to hard, consolidated andesite bedrock

Content (by volume) and size of rock fragments: 10 to 40 percent pebbles in the A horizon and 0 to 10 percent pebbles in the Bw horizon

Reaction: Slightly acid or neutral throughout

A or Ap horizon:

Color—hue of 7.5YR or 10YR, value of 3, and chroma of 2

Texture—clay loam, gravelly clay loam, or very gravelly clay loam

Bw horizon:

Color—hue of 7.5YR or 10YR, value of 3, and chroma of 2

Texture—clay loam or clay

C horizon (where present):

Color—hue of 10YR, value of 3, and chroma of 3

Texture—loamy sand

Cr layer:

Type of bedrock—unconsolidated andesite rock that can be excavated with difficulty using hand tools and is rippable by mechanical equipment

R layer:

Type of bedrock—hard, consolidated, basic andesite bedrock

Fé Series

Depth class: Very deep

Drainage class: Somewhat poorly drained

Permeability: Very slow

Soil Survey of San Germán Area, Puerto Rico

Parent material: Clayey alluvial sediments that weathered from igneous, metamorphic, and sedimentary rocks

Landscape: Basins

Landform: Fan skirts

Commonly associated soils: Aguirre, Cartagena, Fraternidad, Guánica, and Santa Isabel soils

Slope: 0 to 2 percent

Taxonomic class: Fine, smectitic, isohyperthermic Sodic Haplusterts

Typical Pedon

Fé clay, 0 to 2 percent slopes; about 4.3 miles south of the city of Sabana Grande from the intersection of Puerto Rico Highways 102 and 121; about 2.1 miles southwest from the intersection of Puerto Rico Highways 2 and 117; about 1,000 feet west of a dirt road (boundary between Lajas and Guánica Municipalities), in a hayfield; Lajas Municipality; USGS Sabana Grande topographic quadrangle (1966); lat. 18 degrees 1 minute 4 seconds N. and long. 66 degrees 57 minutes 46 seconds W.

Ap—0 to 7 inches; dark reddish brown (5YR 3/2) clay; moderate fine angular blocky structure parting to moderate fine granular; very hard, firm, moderately sticky, moderately plastic; common fine roots; slightly effervescent; moderately alkaline; clear wavy boundary.

A—7 to 17 inches; dark reddish brown (5YR 3/3) clay; moderate medium angular blocky structure; very hard, extremely firm, moderately sticky, moderately plastic; common fine roots along faces of peds; many pressure faces on surfaces of peds; about 2 percent, by volume, pebbles; strongly effervescent; moderately alkaline; clear smooth boundary.

Bssz1—17 to 28 inches; dark reddish brown (5YR 3/3) clay; moderate medium angular blocky structure; firm, slightly sticky, moderately plastic; few fine roots flattened on primary surfaces; common fine slickensides having distinct polished and grooved surfaces; common fine salt crystals; about 2 percent, by volume, pebbles; strongly effervescent; moderately alkaline; clear smooth boundary.

Bssz2—28 to 42 inches; dark reddish gray (5YR 4/2) clay; moderate fine and medium angular blocky structure; firm, slightly sticky, moderately plastic; few fine roots flattened on primary surfaces; common medium slickensides having distinct polished and grooved surfaces; common pressure faces on peds; few fine salt crystals; about 2 percent, by volume, pebbles; strongly effervescent; moderately alkaline; diffuse wavy boundary.

Bss—42 to 56 inches; dark reddish gray (5YR 4/2) clay; moderate fine and medium angular blocky structure; firm, slightly sticky, moderately plastic; common medium slickensides having distinct polished and grooved surfaces; about 10 percent, by volume, pebbles; strongly effervescent; moderately alkaline.

Range in Characteristics

Thickness of the solum: More than 60 inches

Reaction: Moderately alkaline or strongly alkaline throughout

Content (by volume) and size of rock fragments: Less than 15 percent pebbles throughout

A and Ap horizons:

Color—hue of 5YR to 10YR, value of 2 or 3, and chroma of 2 or 3

Texture—clay

Bssz horizon:

Color—hue of 5YR or 7.5YR, value of 3 to 5, and chroma of 2 to 4

Texture—clay

Bss horizon:

Color—hue of 5YR or 7.5YR, value of 3 to 5, and chroma of 2 to 4

Texture—clay

Fraternidad Series

Depth class: Very deep

Drainage class: Moderately well drained

Permeability: Very slow

Parent material: Clayey alluvial sediments that weathered from igneous, metamorphic, and sedimentary rocks

Landscape: Basins

Landform: Fan skirts

Commonly associated soils: Aguilita, Aguirre, Cartagena, Fé, Guánica, Jácana, Olivares, Palmarejo, Pozo Blanco, and Santa Isabel soils

Slope: 0 to 5 percent

Taxonomic class: Fine, smectitic, isohyperthermic Typic Haplusterts

Typical Pedon

Fraternidad clay, 0 to 2 percent slopes; about 1.1 miles southwest of the city of Lajas from the intersection of the Puerto Rico Highways 315 and 101; about 0.7 mile southeast of the community of Palmarejo from the intersection of the Puerto Rico Highways 306 and 101; about 0.5 mile northeast of the Administration Building of the Lajas Agricultural Experiment Station of the University of Puerto Rico-Mayagüez Campus; about 300 feet southeast from a dirt road, in a pasture; Lajas Municipality; USGS San Germán topographic quadrangle (1966); lat. 18 degrees 2 minutes 20 seconds N. and long. 67 degrees 4 minutes 5 seconds W.

Ap—0 to 13 inches; very dark gray (10YR 3/1) clay; strong medium and coarse granular structure; very firm, sticky, plastic; many very fine and fine roots; common fine iron-manganese concretions; about 2 percent, by volume, mixed (igneous, metamorphic, and sedimentary) pebbles; slightly alkaline; clear wavy boundary.

ABss—13 to 17 inches; 60 percent very dark grayish brown (10YR 3/2) and 40 percent brown (10YR 4/3) clay; strong medium and coarse angular blocky structure; firm, sticky, plastic; common very fine roots; few distinct intersecting slickensides having distinct polished and grooved surfaces; common fine iron-manganese concretions; about 3 percent, by volume, mixed (igneous, metamorphic, and sedimentary) pebbles; moderately alkaline; clear irregular boundary.

Bss1—17 to 42 inches; dark yellowish brown (10YR 4/4) clay; strong medium and coarse angular blocky structure; firm, sticky, plastic; common very fine roots; few distinct intersecting slickensides having prominent polished and grooved surfaces; common fine iron-manganese concretions; about 2 percent, by volume, pebbles; few fine filaments of calcium carbonate; moderately alkaline; gradual wavy boundary.

Bss2—42 to 65 inches; 70 percent dark yellowish brown (10YR 4/6) and 30 percent brown (10YR 4/3) clay; strong medium and coarse angular blocky structure; firm, sticky, plastic; common very fine roots; very few faint intersecting slickensides having prominent polished and grooved surfaces; many fine and medium iron-manganese concretions; about 2 percent, by volume, mixed (igneous, metamorphic, and sedimentary) pebbles; common fine filaments of calcium carbonate; moderately alkaline.

Range in Characteristics

Thickness of the solum: More than 60 inches

Content (by volume) and size of rock fragments: Less than 5 percent mixed (igneous, metamorphic, and sedimentary) pebbles

Reaction: Slightly alkaline or moderately alkaline throughout

A or Ap horizon:

Color—hue of 10YR or 2.5Y, value of 2 to 4, and chroma of 1 to 3

Texture—clay

AB or BA horizon (where present):

Color—hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 to 4

Texture—clay

ABss horizon (where present):

Color—hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 2 to 4

Texture—clay

Bss horizon:

Color—hue of 7.5YR or 2.5Y, value of 2.5 to 6, and chroma of 1 to 8

Texture—clay

Guamá Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderate

Parent material: Iron-rich residuum that weathered from serpentinite bedrock

Landscape: Mountains

Landform: Mountain slopes

Commonly associated soils: Aljibe, Cerro Gordo, El Descanso, Hoconuco, and Indiera soils

Slope: 20 to 60 percent

Taxonomic class: Very-fine, ferruginous, isothermic Rhodic Haploperox

Typical Pedon

Guamá soil in an area of Aljibe-Guamá-Indiera complex, 20 to 60 percent slopes; about 4.2 miles east of the community of Rosario from the intersection of Puerto Rico Highways 330 and 348; about 2.1 miles northeast from the intersection of Puerto Rico Highways 119 and 348; about 0.3 mile west on El Alto del Descanso trail road cut, in forestland; San Germán Municipality; USGS Rosario topographic quadrangle (1964); lat. 18 degrees 9 minutes 26.2 seconds N. and long. 67 degrees 0 minutes 11.1 seconds W.

Oi—0 to 4 inches; black (10YR 2/1) mucky peat; about 70 percent fiber crushed and rubbed; massive; very friable, nonsticky, nonplastic; many very fine and fine roots; very strongly acid; very abrupt smooth boundary.

A—4 to 13 inches; dusky red (10R 3/4) clay; strong fine granular structure; slightly hard, friable, slightly sticky, moderately plastic; many very fine, fine, medium, and coarse roots; many very fine and fine irregular pores; strongly acid; clear smooth boundary.

Bo1—13 to 30 inches; dark red (2.5YR 3/6) clay; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky, moderately plastic; common very fine, fine, medium, and coarse roots; common very fine and fine irregular and few very fine tubular pores; moderately acid; clear smooth boundary.

Bo2—30 to 39 inches; dark red (2.5YR 3/6) clay; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, moderately plastic; few fine and medium roots; common very fine and fine irregular and few very fine tubular pores; moderately acid; abrupt wavy boundary.

BC—39 to 61 inches; dark reddish brown (2.5YR 3/4) clay; weak fine subangular blocky structure; soft, friable, slightly sticky, moderately plastic; few fine and medium distinct ferriargillans on faces of peds; few fine and medium roots; many very fine and fine tubular and few fine irregular pores; about 2 percent, by volume, ironstone pebbles; neutral; very abrupt wavy boundary.

C—61 to 82 inches; 20 percent dark red (10R 3/6), 20 percent dark reddish brown (2.5YR 3/4), 20 percent yellowish red (5YR 5/8), 20 percent reddish yellow (7.5YR 6/8), and 20 percent olive (5Y 4/3) clay; massive; soft, friable, slightly sticky, moderately plastic; many very fine and fine tubular and few fine irregular pores; neutral.

Range in Characteristics

Thickness of the solum: 45 to more than 60 inches

Depth to bedrock: More than 80 inches

Content of iron-manganese concretions: Less than 15 percent, by volume, throughout

Reaction: Very strongly acid to moderately acid in the Oi and A horizons, moderately acid or slightly acid in the Bo horizon, and slightly acid or neutral in the BC and C horizons

Oi horizon:

Color—hue of 7.5YR or 10YR, value of 2 or 2.5, and chroma of 1 or 2

Texture—mucky peat or muck

A horizon:

Color—hue of 10R or 2.5YR, value of 3, and chroma of 3 or 4

Texture—clay

Bo horizon:

Color—hue of 10R or 2.5YR, value of 3 or 4, and chroma of 3 to 6

Texture—clay

BC horizon:

Color—hue of 2.5YR or 5YR, value of 3 or 4, and chroma of 4 to 6

Texture—silty clay loam, clay loam, or clay

C horizon:

Color—no dominant color; multicolored in shades of red, brown, and yellow

Texture—silty clay loam, clay loam, or clay

Guanábano Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderate

Parent material: Colluvial deposits of sand, gravel, mudstone, and sandstone or deposits of shale, sandy limestone, and sandy conglomerate

Landscape: Low hills

Landform: Ridges and hillslopes

Commonly associated soils: Coamo, Descalabrado, Jácana, and Malaya soils

Slope: 20 to 60 percent

Taxonomic class: Fine, smectitic, isohyperthermic Calcic Argiustolls

Typical Pedon

Guanábano clay, 20 to 60 percent slopes; about 1.0 mile north of downtown Yauco from the intersection of Puerto Rico Highways 128 and 335; about 0.2 mile southeast from the intersection of Puerto Rico Highways 128 and 3371; about 50 feet north of a paved road, in naturalized pastureland; Yauco Municipality; USGS Yauco topographic

quadrangle (1966); lat. 18 degrees 3 minutes 0 seconds N. and long. 66 degrees 50 minutes 57 seconds W.

Ap—0 to 2 inches; very dark brown (10YR 2/2) clay; strong fine and medium granular structure; slightly hard, firm, slightly sticky, moderately plastic; many very fine, common fine, and few medium roots; common fine interstitial pores; less than 10 percent, by volume, pebbles; slightly effervescent; slightly acid; abrupt wavy boundary.

AB—2 to 6 inches; very dark brown (10YR 2/2) clay; strong medium and coarse subangular blocky structure; hard, very firm, moderately sticky, moderately plastic; common fine and medium roots; common fine irregular and few fine tubular pores; about 5 percent, by volume, pebbles and 1 percent cobbles; slightly effervescent; slightly acid; clear wavy boundary.

Btk1—6 to 13 inches; dark reddish brown (5YR 3/4) clay; strong medium and coarse subangular blocky structure; hard, very firm, moderately sticky, moderately plastic; few fine and medium roots; common fine irregular and few fine tubular pores; common continuous prominent clay films on faces of peds; about 10 percent, by volume, pebbles; common fine calcium carbonate threads around rock fragments; slightly effervescent; slightly acid; abrupt wavy boundary.

Btk2—13 to 21 inches; dark yellowish brown (10YR 4/4) gravelly clay; moderate medium subangular blocky structure; slightly hard, firm, slightly sticky, moderately plastic; few fine and medium roots; few fine and medium interstitial pores; few continuous prominent clay films on faces of peds; about 25 percent, by volume, pebbles and 2 percent cobbles; common fine calcium carbonate threads around rock fragments; slightly effervescent; neutral; abrupt wavy boundary.

C—21 to 80 inches; 40 percent brown (10YR 4/3), 30 percent dark grayish brown (10YR 4/2), and 30 percent dark yellowish brown (10YR 4/4) cobbly clay loam; massive; slightly hard, friable, slightly sticky, nonplastic; few fine and medium roots; few fine and medium interstitial pores; about 60 percent, by volume, pebbles and 20 percent cobbles; slightly effervescent; neutral.

Range in Characteristics

Thickness of the solum: 17 to 28 inches

Content (by volume) and size of rock fragments: 5 to 25 percent pebbles and less than 2 percent cobbles in the Ap and AB horizons, less than 35 percent pebbles and cobbles in the Bt horizon, and 15 to 85 percent pebbles and 10 to 20 percent cobbles in the C horizon

Reaction: Strongly acid to neutral in the A and AB horizons and slightly acid or neutral in the Btk and C horizons

A or Ap horizon:

Color—hue of 7.5YR or 10YR, value of 2 to 4, and chroma of 2 to 4

Texture—clay loam, silty clay loam, clay, or their gravelly analogs

AB horizon:

Color—hue of 5YR to 10YR, value of 2 to 4, and chroma of 2 to 4

Texture—clay or gravelly clay

Btk horizon:

Color—hue of 5YR to 10YR, value of 3 or 4, and chroma of 2 to 4

Texture—clay or gravelly clay

C horizon:

Color—hue of 10YR, value of 4 or 5, and chroma of 2 to 6; or multicolored in shades of brown, yellow, and gray

Texture—clay loam, clay, or their gravelly to extremely gravelly analogs or cobbly analogs

Guanajibo Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderate

Parent material: Fine-textured sediments of mixed origin

Landscape: Coastal plains

Landform: Coastal terraces and alluvial fans

Commonly associated soils: Atolladero, Cabo Rojo, Cataño, Delicias, Joyuda, and Voladora soils

Slope: 2 to 12 percent

Taxonomic class: Very-fine, ferruginous, isohyperthermic Plinthic Kandihumults

Typical Pedon

Guanajibo gravelly sandy clay loam, 2 to 12 percent slopes (fig. 26); about 0.9 mile northwest from the intersection of Puerto Rico Highways 100 and 311; about 600 feet north of the road, in naturalized pastureland; Cabo Rojo Municipality; USGS Mayagüez topographic quadrangle (1966); lat. 18 degrees 7 minutes 43 seconds N. and long. 67 degrees 10 minutes 6 seconds W.

Ap—0 to 10 inches; dark reddish brown (5YR 3/2) gravelly sandy clay loam; moderate fine granular structure; friable, nonsticky, nonplastic; many very fine and fine and few medium and coarse roots; common very fine and few fine irregular pores; about 21 percent, by volume, ironstone pebbles; strongly acid; abrupt wavy boundary.

Bt—10 to 21 inches; strong brown (7.5YR 5/8) clay; moderate fine and medium subangular blocky structure; firm, slightly sticky, slightly plastic; few faint clay films on faces of peds and in root channels; common fine roots; common very fine and fine irregular pores; about 3 percent, by volume, ironstone pebbles; common medium distinct red (2.5YR 5/8) masses of iron accumulation; very strongly acid; clear wavy boundary.

Btv1—21 to 30 inches; strong brown (7.5YR 5/6) clay; weak fine and medium subangular blocky structure; firm, slightly sticky, slightly plastic; few faint clay films on faces of peds and in root channels; few fine roots; common very fine and fine irregular pores; about 5 percent, by volume, ironstone pebbles; about 5 percent, by volume, plinthite; common medium distinct red (2.5YR 4/8) masses of iron accumulation; very strongly acid; clear wavy boundary.

Btv2—30 to 37 inches; strong brown (7.5YR 5/6) clay; weak fine and medium subangular blocky structure; firm, slightly sticky, slightly plastic; few faint clay films on faces of peds and in root channels; few fine roots; common very fine and few fine irregular pores; about 3 percent, by volume, ironstone pebbles; about 10 percent, by volume, plinthite; many medium distinct red (2.5YR 4/6) masses of iron accumulation; very strongly acid; gradual irregular boundary.

Btv3—37 to 63 inches; 20 percent light olive brown (2.5Y 5/6), 20 percent pale yellow (2.5Y 8/3), 20 percent dark red (2.5YR 3/6), 20 percent strong brown (7.5YR 4/6), and 20 percent brown (10YR 4/3) clay; weak fine and medium subangular blocky structure; few faint clay films on faces of peds; firm, slightly sticky, slightly plastic; few fine roots; common fine pores; about 4 percent, by volume, ironstone pebbles; about 25 percent, by volume, plinthite; the areas of olive brown, dark red, and brown are masses of iron accumulation and the areas of pale yellow are iron depletions; very strongly acid.

Range in Characteristics

Thickness of the solum: More than 60 inches

Content (by volume) and size of rock fragments: 0 to 30 percent pebbles throughout

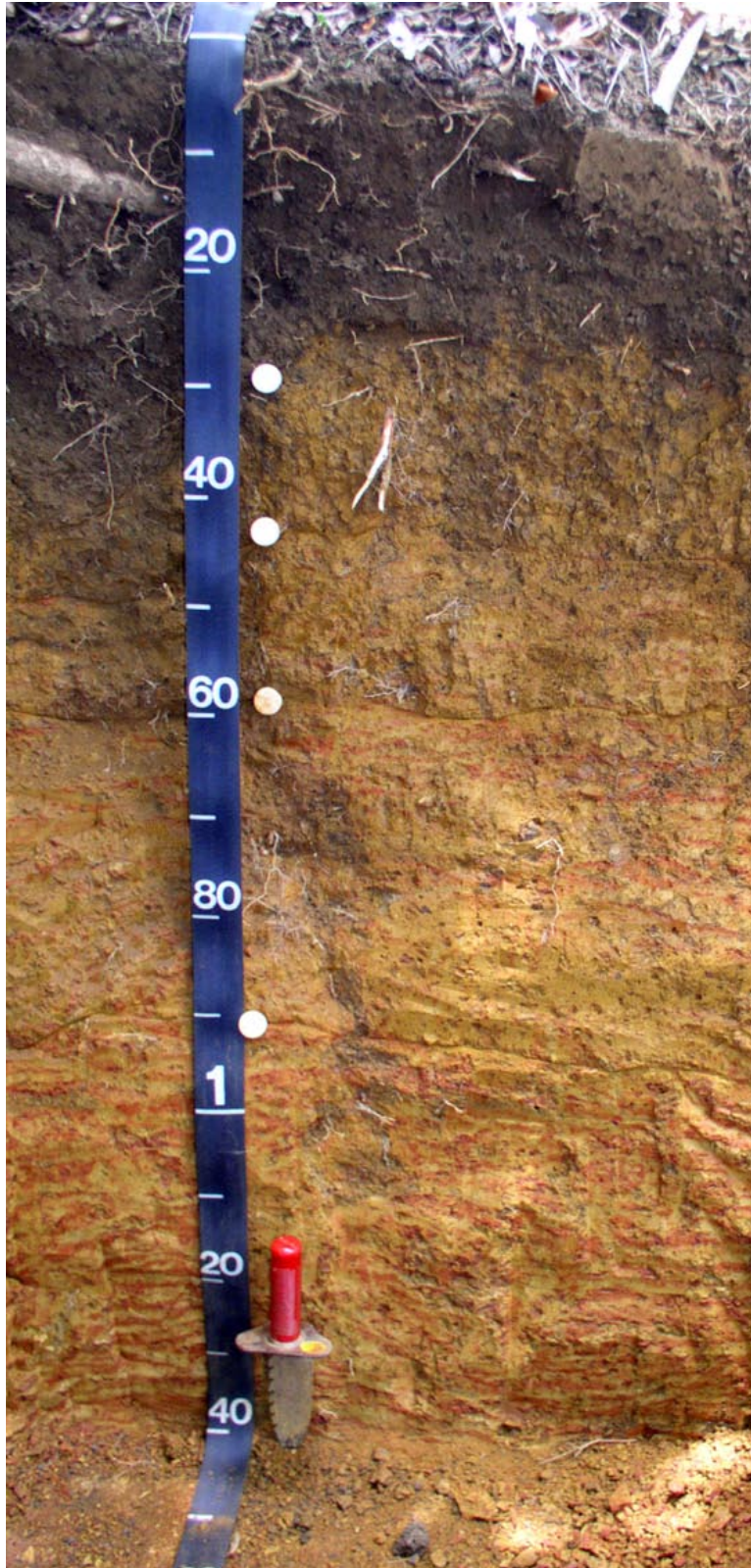


Figure 26.—Profile of Guanajibo gravelly sandy clay loam, 2 to 12 percent slopes. Guanajibo soils are characterized by a surface layer of gravelly sandy clay loam, clayey subsurface layers, and a content of plinthite of 5 percent or more. They are in the udic soil moisture regime.

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Content of plinthite: 5 to 30 percent, by volume

Reaction: Very strongly acid or strongly acid throughout

A or Ap horizon:

Color—hue of 5YR, value of 2 or 3, and chroma of 2 or 3

Texture—loam, sandy clay loam, or their gravelly analogs

Bt horizon:

Color—hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 6 to 8

Texture—clay loam, clay, or their gravelly analogs

Btv horizon (upper part):

Color—hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 6 to 8

Texture—clay loam, clay, or their gravelly analogs

Content of plinthite—5 to 15 percent, by volume

Btv horizon (lower part):

Color—hue of 2.5YR to 7.5YR, value of 4 to 6, and chroma of 6 to 8; or no dominant matrix color and multicolored in shades of red, brown, and yellow

Texture—clay loam, clay, or their gravelly analogs

Content of plinthite—10 to 30 percent, by volume

Guánica Series

Depth class: Very deep

Drainage class: Somewhat poorly drained

Permeability: Very slow

Parent material: Clayey alluvial sediments that weathered from igneous, metamorphic, and sedimentary rocks

Landscape: Basins

Landform: Basin floors

Commonly associated soils: Aguirre, Cartagena, Fé, Fraternidad, and Santa Isabel soils

Slope: 0 to 1 percent

Taxonomic class: Very-fine, smectitic, isohyperthermic Typic Calciaquerts

Typical Pedon

Guánica clay, 0 to 1 percent slopes; about 2.3 miles southeast from the intersection of Puerto Rico Highways 121 and 367, near of the community of Machuchal; about 0.5 mile northeast of the Lajas Valley main drainage channel; about 2,300 feet southeast of a dirt road, in naturalized pastureland; Guánica Municipality; USGS San Germán topographic quadrangle (1966); lat. 18 degrees 0 minutes 30 seconds N. and long. 66 degrees 57 minutes 19 seconds W.

Ap—0 to 4 inches; black (5YR 2.5/1) clay; moderate fine and medium granular structure; hard, firm, very sticky, very plastic; many fine and medium roots; about 1 percent, by volume, pebbles; noneffervescent; slightly alkaline; abrupt wavy boundary.

BA—4 to 12 inches; black (10YR 2/1) clay; strong coarse prismatic and strong fine and medium angular blocky structure; hard, firm, very sticky, very plastic; many fine and medium roots; common faint pressure faces; few fine and medium calcium carbonate concretions; about 1 percent, by volume, pebbles; slightly effervescent; slightly alkaline; clear wavy boundary.

Bssk1—12 to 25 inches; black (5YR 2.5/1) clay; strong coarse wedge-shaped and strong fine and medium angular blocky structure; hard, firm, very sticky, very plastic; common fine and medium roots; many faint intersecting slickensides having prominent polished and grooved surfaces; few fine and medium calcium

carbonate concretions; about 1 percent, by volume, pebbles; strongly effervescent; moderately alkaline; clear wavy boundary.

Bssk2—25 to 33 inches; 70 percent black (5YR 2.5/1) and 30 percent dark reddish brown (5YR 3/3) clay; strong coarse wedge-shaped and strong fine and medium angular blocky structure; hard, firm, very sticky, very plastic; few fine and medium roots; many faint intersecting slickensides having prominent polished and grooved surfaces; few fine and medium calcium carbonate concretions; about 1 percent, by volume, pebbles; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bssk3—33 to 52 inches; 80 percent dark reddish brown (5YR 3/3) and 20 percent dark reddish brown (5YR 3/2) clay; strong coarse wedge-shaped and strong medium and coarse angular blocky structure; hard, firm, very sticky, very plastic; few very fine roots; many faint intersecting slickensides having prominent polished and grooved surfaces; common faint continuous black (5YR 2.5/1) organic coats; few very fine calcium carbonate concretions; about 1 percent, by volume, pebbles; strongly effervescent; moderately alkaline; clear wavy boundary.

Bsszk1—52 to 68 inches; reddish brown (2.5YR 4/3) clay; strong coarse wedge-shaped and strong medium and coarse angular blocky structure; hard, firm, very sticky, very plastic; few very fine roots; many faint intersecting slickensides having prominent polished and grooved surfaces; many salt crystals; few faint organic coats; few fine and medium soft masses of calcium carbonate; few very fine and fine iron-manganese concretions; about 1 percent, by volume, pebbles; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bsszk2—68 to 79 inches; reddish brown (2.5YR 4/3) clay; strong coarse wedge-shaped and strong medium and coarse angular blocky structure; hard, firm, very sticky, very plastic; few very fine roots; common faint intersecting slickensides having prominent polished and grooved surfaces; common salt crystals; few faint iron-manganese stains; few fine and medium soft masses of calcium carbonate; few very fine and fine iron-manganese concretions; about 1 percent, by volume, pebbles; strongly effervescent; moderately alkaline.

Range in Characteristics

Thickness of the solum: More than 60 inches

Content (by volume) and size of rock fragments: Less than 5 percent pebbles throughout

Reaction: Slightly alkaline or moderately alkaline throughout

A or Ap horizon:

Color—hue of 10YR or 2.5Y, value of 2 to 3, and chroma of 1 to 3

Texture—clay

Calcium carbonate—none to common concentrations

AB or BA horizon:

Color—hue of 10YR or 2.5Y, value of 2 to 3, and chroma of 1 to 3

Texture—clay

Calcium carbonate—none to common concentrations

Pressure faces—none to common

Bss horizon (where present):

Color—hue of 5YR to 2.5Y, value of 2.5 or 3, and chroma of 1 or 2

Texture—clay

Concentrations of calcium carbonate and iron-manganese—none to few

Bssk horizon:

Color—hue of 5YR to 2.5Y, value of 2 to 5, and chroma of 1 to 6

Texture—clay

Concentrations of calcium carbonate and iron-manganese masses—common or many

Bsszk horizon:

Color—hue of 2.5YR to 10YR, value of 3 to 5, and chroma of 2 to 6

Texture—clay

Concentrations of calcium carbonate and iron-manganese masses—few or common

Concentrations of salt crystals—few to many

Guayabo Series

Depth class: Very deep

Drainage class: Excessively drained

Permeability: Rapid

Parent material: Sandy marine deposits

Landscape: Coastal plains

Landform: Coastal plains

Commonly associated soils: Bahía, Bahía Salinas, and Sosa soils

Slope: 0 to 5 percent

Taxonomic class: Mixed, isohyperthermic Arenic Paleargids

Typical Pedon

Guayabo fine sand, 0 to 5 percent slopes; about 2.2 miles southwest from the intersection of Puerto Rico Highways 301 and 303; about 0.5 mile south of the community of Pole Ojea from the intersection of Puerto Rico Highways 301 and 3301; about 1,200 feet northwest of a dirt road, in an area of wildlife habitat; Cabo Rojo Municipality; USGS Cabo Rojo topographic quadrangle (1966); lat. 17 degrees 58 minutes 22 seconds N. and long. 67 degrees 11 minutes 0 seconds W.

Ap—0 to 7 inches; brown (10YR 5/3) fine sand; single grained; loose, loose, nonsticky, nonplastic; neutral; clear smooth boundary.

E1—7 to 13 inches; pale brown (10YR 6/3) sand; single grained; loose, loose, nonsticky, nonplastic; neutral; clear smooth boundary.

E2—13 to 18 inches; pale brown (10YR 6/3) fine sand; single grained; loose, loose, nonsticky, nonplastic; common medium faint strong brown (7.5YR 5/6) stains in root channels; neutral; clear smooth boundary.

E3—18 to 35 inches; very pale brown (10YR 7/3) sand; single grained; loose, loose, nonsticky, nonplastic; few fine strong brown (7.5YR 5/6) stains in root channels; neutral; gradual wavy boundary.

E4—35 to 55 inches; very pale brown (10YR 7/3) sand; single grained; loose, loose, nonsticky, nonplastic; neutral; gradual wavy boundary.

EB—55 to 65 inches; very pale brown (10YR 7/4) fine sand; single grained; loose, loose, nonsticky, nonplastic; about 1 percent, by volume, pebbles; few fine distinct yellowish red (5YR 5/6) masses of iron accumulation; neutral; clear smooth boundary.

Bt—65 to 80 inches; about 34 percent strong brown (7.5YR 5/6), 33 percent pale brown (10YR 6/3), and 33 percent red (2.5YR 4/6) loamy sand; very friable, nonsticky, nonplastic; few faint clay bridges between mineral grains; about 10 percent, by volume, pebbles; neutral.

Range in Characteristics

Thickness of the solum: More than 60 inches

Content (by volume) and size of rock fragments: Less than 15 percent pebbles throughout

Reaction: Slightly acid to moderately alkaline throughout

Ap or A horizon:

Color—hue of 10YR, value of 3 to 5, and chroma of 2 to 4

Texture—fine sand, sand, loamy fine sand, or loamy sand

E horizon:

Color—hue of 7.5YR to 2.5YR, value of 5 to 7, and chroma of 3 to 6

Texture—sand or fine sand

EB horizon (where present):

Color—hue of 10YR, value of 4 to 7, and chroma of 4 to 6

Texture—fine sand, loamy sand, or sandy loam

Masses of iron accumulation—few or common in shades of red, brown, and yellow

Bt horizon:

Color—hue of 2.5YR to 2.5Y, value of 4 to 6, and chroma of 3 to 6; or no dominant color and multicolored in shades of red, brown, and yellow

Texture—loamy sand, loamy fine sand, sandy loam, sandy clay loam, or sandy clay

Guayacán Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderately slow

Parent material: Material that weathered from limestone

Landscape: Uplands

Landform: Low hills and alluvial fans

Commonly associated soils: Altamira, Costa, Melones, Montalva, Parguera, and Pitahaya soils

Slope: 0 to 20 percent

Taxonomic class: Fine-loamy, mixed, superactive, isohyperthermic Typic Haplocalcids

Typical Pedon

Guayacán clay, 0 to 5 percent slopes; about 2.9 miles southwest of the community of La Parguera; about 2.2 miles southeast of Rancho Cabassa; about 100 feet east of a dirt road, in pastureland; Lajas Municipality; USGS Parguera topographic quadrangle (1966); lat. 17 degrees 57 minutes 58 seconds N. and long. 67 degrees 5 minutes 30 seconds W.

Ap—0 to 8 inches; dark brown (7.5YR 3/3) clay; strong medium granular structure; firm, slightly sticky, slightly plastic; many very fine, fine, and medium roots; many very fine interstitial pores; about 2 percent, by volume, pebbles; slightly effervescent; moderately alkaline; clear wavy boundary.

Bw—8 to 12 inches; very dark grayish brown (10YR 3/2) clay; strong medium angular blocky structure; firm, slightly sticky, moderately plastic; many very fine and fine and few medium roots; many very fine and few fine tubular and vesicular pores; about 3 percent, by volume, pebbles; moderately effervescent; moderately alkaline; clear wavy boundary.

Bk1—12 to 25 inches; dark yellowish brown (10YR 4/4) clay; moderate medium subangular blocky structure; firm, slightly sticky, moderately plastic; many very fine and few fine roots; many very fine and few fine tubular and vesicular pores; common filaments of calcium carbonate; about 10 percent, by volume, pebbles; moderately effervescent; moderately alkaline; abrupt wavy boundary.

Bk2—25 to 45 inches; yellowish brown (10YR 5/4) gravelly loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; many very fine and common fine roots; many very fine and common fine tubular and vesicular

pores; many prominent soft masses of calcium carbonate; about 16 percent, by volume, pebbles; strongly effervescent; moderately alkaline; clear wavy boundary.

C—45 to 59 inches; brown (10YR 4/3) loam; massive; friable, slightly sticky, nonplastic; many very fine and common fine roots; many very fine and few fine tubular and vesicular pores; common prominent soft masses of calcium carbonate; about 5 percent, by volume, pebbles; strongly effervescent; moderately alkaline; clear wavy boundary.

2C—59 to 76 inches; very dark grayish brown (10YR 3/2) very gravelly silt loam; massive; friable, slightly sticky, nonplastic; few very fine roots; many very fine tubular and vesicular pores; many prominent very pale brown (10YR 7/3) soft masses of calcium carbonate; about 45 percent, by volume, pebbles; strongly effervescent; strongly alkaline; gradual wavy boundary.

3C—76 to 90 inches; very dark grayish brown (10YR 3/2) gravelly clay loam; massive; friable, slightly sticky, slightly plastic; few fine and medium roots; few very fine tubular and vesicular pores; common prominent very pale brown (10YR 7/3) soft masses of calcium carbonate; about 5 percent, by volume, pebbles; strongly effervescent; moderately alkaline.

Range in Characteristics

Thickness of the solum: 35 to 60 inches

Content (by volume) and size of rock fragments: 0 to 10 percent pebbles in the A horizon, 0 to 25 percent pebbles in the Bw and Bk horizons, and 0 to 60 percent pebbles in the C horizon

Reaction: Slightly alkaline or moderately alkaline in the A or Ap horizon and in the Bw horizon and moderately alkaline in the Bk and C horizons

A or Ap horizon:

Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 or 3

Texture in the fine-earth fraction—loam, clay loam, or clay

Bw horizon (where present):

Color—hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4

Texture in the fine-earth fraction—loam, clay loam, or clay

Bk horizon:

Color—hue of 10YR, value of 4 to 6, and chroma of 4 to 6

Texture in the fine-earth fraction—loam, clay loam, or clay

Calcium carbonate—common or many filaments and soft masses

C horizon:

Color—hue of 10YR to 5Y, value of 3 to 7, and chroma of 2 to 6

Texture in the fine-earth fraction—silt loam or clay loam

Calcium carbonate—common or many filaments and soft masses

Hoconuco Series

Depth class: Shallow

Drainage class: Well drained

Permeability: Slow

Parent material: Residuum that weathered from serpentinite bedrock

Landscape: Serpentinite mountains

Landform: Ridges and mountain slopes

Commonly associated soils: Aljibe, Cerro Gordo, El Descanso, Guamá, and Indiera soils

Soil Survey of San Germán Area, Puerto Rico

Slope: 5 to 90 percent

Taxonomic class: Clayey, magnesian, isothermic, shallow Typic Argiudolls

Typical Pedon

Hoconuco soil in an area of El Descanso-Hoconuco complex, 20 to 60 percent slopes; about 0.6 mile northwest from the headquarters of Maricao State Forest (Campamento Buena Vista); about 200 feet east from El Alto del Descanso Peak, in forestland; San Germán Municipality; USGS Maricao topographic quadrangle (1960); lat. 18 degrees 8 minutes 50 seconds N. and long. 66 degrees 59 minutes 47 seconds W.

Oi—0 to 3 inches; very dark brown (7.5YR 2.5/2) mucky peat; about 85 percent fiber crushed and rubbed; massive; very friable, nonsticky, nonplastic; many very fine and fine and few medium and coarse roots; about 10 percent, by volume, cobbles and 2 percent stones; strongly acid; clear wavy boundary.

A—3 to 7 inches; dark brown (7.5YR 3/2) gravelly clay loam; strong very fine and fine granular structure; slightly hard, firm, slightly sticky, moderately plastic; many very fine and fine and few medium and coarse roots; many very fine and fine irregular pores; about 28 percent, by volume, angular pebbles and 2 percent angular cobbles; slightly acid; abrupt wavy boundary.

Bt—7 to 14 inches; dark reddish brown (5YR 3/3) paragravelly clay; moderate very fine and fine subangular blocky structure; hard, firm, slightly sticky, moderately plastic; common very fine and fine roots; common very fine and fine irregular and few very fine and fine interstitial pores; common distinct clay films on faces of peds and coarse fragments; about 12 percent, by volume, angular parapebbles and 6 percent angular paracobbles; neutral; abrupt irregular boundary.

Cr—14 to 37 inches; hard, fractured, moderately weathered serpentinite bedrock.

R—37 inches; hard, fractured, consolidated serpentinite bedrock.

Range in Characteristics

Thickness of the solum: 5 to 13 inches

Depth to fractured, moderately weathered bedrock: 11 to 25 inches

Depth to bedrock: 20 to 37 inches

Content (by volume) and size of rock fragments: 2 to less than 15 percent pebbles and cobbles in the Oi horizon, 2 to 30 percent pebbles and cobbles in the A horizon, and 2 to 20 percent parapebbles and paracobbles in the Bt horizon

Reaction: Strongly acid to slightly acid in the Oi horizon and slightly acid or neutral in the A and Bt horizons

Oi horizon:

Color—hue of 7.5YR or 10YR, value of 2 to 3, and chroma of 1 or 2

Texture—mucky peat

A horizon:

Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 or 2

Texture—clay loam, clay, or their gravelly analogs

Bt horizon:

Color—hue of 5YR to 10YR, value of 3 or 4, and chroma of 2 or 3

Texture—clay or paragravelly clay

Cr horizon:

Type of paralithic contact—highly fractured, moderately weathered serpentinite that can be excavated with difficulty using hand tools and is rippable by mechanical equipment

R layer:

Type of bedrock—hard, fractured, consolidated serpentinite bedrock

Humatas Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderately slow

Parent material: Clayey and loamy residuum that weathered from igneous bedrock

Landscape: Hills and mountains

Landform: Ridges, hillslopes, and mountain slopes

Commonly associated soils: Caguabo, Consumo, Morado, Múcara, and Quebrada soils

Slope: 12 to 60 percent

Taxonomic class: Very-fine, parasesquic, isohyperthermic Typic Haplohumults

Typical Pedon

Humatas clay, 40 to 60 percent slopes; about 5.8 miles southeast of downtown Maricao from the intersection of Puerto Rico Highways 105 and 120; about 2.0 miles south of the intersection of Puerto Rico Highways 366 and 3365; about 600 feet southwest of Puerto Rico Highway 3365, in a coffee plantation; Yauco Municipality; USGS Maricao topographic quadrangle (1960); lat. 18 degrees 7 minutes 32 seconds N. and long. 66 degrees 54 minutes 52 seconds W.

Ap—0 to 5 inches; red (2.5YR 4/6) clay; strong very fine and fine granular structure; slightly hard, firm, slightly sticky, plastic; common very fine and fine roots; common very fine and fine interstitial and few fine tubular pores; strongly acid; clear smooth boundary.

Bt1—5 to 14 inches; red (2.5YR 4/8) clay; moderate very fine and fine subangular blocky structure; slightly hard, firm, slightly sticky, plastic; many prominent clay films on faces of peds; few very fine and fine roots; common very fine and fine interstitial and few very fine and fine tubular pores; very strongly acid; clear smooth boundary.

Bt2—14 to 23 inches; red (2.5YR 4/8) clay; strong very fine to medium subangular blocky structure; slightly hard, firm, slightly sticky, plastic; many prominent clay films on faces of peds; few very fine and fine roots; common very fine and fine interstitial and few very fine and fine tubular pores; very strongly acid; diffuse smooth boundary.

Bt3—23 to 32 inches; red (2.5YR 4/6) clay; moderate very fine to medium subangular blocky structure; slightly hard, firm, slightly sticky, plastic; many prominent clay films on faces of peds; few very fine roots; common very fine and fine interstitial and few very fine tubular pores; very strongly acid; clear wavy boundary.

BC—32 to 44 inches; red (2.5YR 4/6) clay; weak very fine and fine subangular blocky structure; slightly hard, firm, slightly sticky, plastic; about 25 percent, by volume, saprolite-like material; few very fine roots; common very fine and fine interstitial and few very fine tubular pores; very strongly acid; abrupt irregular boundary.

C—44 to 65 inches; 20 percent dark red (10R 3/6), 20 percent red (10R 5/8), 20 percent red (2.5YR 4/6), 20 percent strong brown (7.5YR 5/8), and 20 percent reddish yellow (7.5YR 6/6) variegated saprolite having a texture of silty clay loam; massive; soft, friable, moderately sticky, moderately plastic; very strongly acid.

Range in Characteristics

Thickness of the solum: 30 to 50 inches

Content (by volume) and size of rock fragments: Less than 20 percent pebbles throughout

Reaction: Strongly acid or very strongly acid throughout

A or Ap horizon:

Color—hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 4 to 8

Texture—silty clay, clay, or their gravelly analogs

Bt horizon (upper part):

Color—hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8
Texture—clay or gravelly clay

Bt horizon (lower part):

Color—hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8
Texture—clay loam, clay, or their gravelly analogs

BC horizon (where present):

Color—hue of 2.5YR or 5YR, value of 4, and chroma of 6
Texture—silty clay loam, clay loam, clay, or their gravelly analogs

C horizon:

Color—no dominant color and multicolored in shades of red, brown, and yellow
Texture—silty clay loam, clay loam, or their gravelly analogs

Indiera Series

Depth class: Deep

Drainage class: Well drained

Permeability: Moderate

Parent material: Iron-rich residuum that weathered from serpentinite bedrock

Landscape: Mountains

Landform: Mountain slopes

Commonly associated soils: Aljibe, Cerro Gordo, El Descanso, Guamá, and Hoconuco soils

Slope: 20 to 60 percent

Taxonomic class: Very-fine, ferruginous, isothermic Typic Haploperox

Typical Pedon

Indiera soil in an area of Aljibe-Guamá-Indiera complex, 20 to 60 percent slopes; about 4.2 miles east of the community of Rosario from the intersection of Puerto Rico Highways 330 and 348; about 2.1 miles northeast from the intersection of Puerto Rico Highways 119 and 348; about 0.4 mile west on El Alto del Descanso trail road cut, in forestland; San Germán Municipality; USGS Rosario topographic quadrangle (1964); lat. 18 degrees 9 minutes 27.3 seconds N. and long. 67 degrees 0 minutes 12.9 seconds W.

Oi—0 to 3 inches; black (10YR 2/1) mucky peat; about 75 percent fiber crushed and rubbed; massive; friable, nonsticky, nonplastic; many very fine roots; very strongly acid; very abrupt smooth boundary.

A—3 to 8 inches; dark reddish brown (2.5YR 3/3) clay; strong fine granular structure; slightly hard, friable, slightly sticky, moderately plastic; common very fine, fine, and medium roots; many very fine and fine irregular pores; about 10 percent, by volume, ironstone pebbles; strongly acid; clear smooth boundary.

Bo1—8 to 14 inches; dusky red (10R 3/3) clay; moderate fine granular structure parting to weak fine subangular blocky; slightly hard, friable, slightly sticky, moderately plastic; few fine, medium, and coarse roots; common very fine and fine irregular pores and few fine interstitial pores; slightly acid; clear smooth boundary.

Bo2—14 to 22 inches; 50 percent dusky red (10R 3/4) and 50 percent dark red (2.5YR 3/6) clay; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky, moderately plastic; few fine, medium, and coarse roots; common very fine and fine irregular and few very fine tubular pores; neutral; clear wavy boundary.

BC—22 to 47 inches; 50 percent dusky red (10R 3/4), 25 percent dark reddish brown (5YR 3/2), and 25 percent brown (7.5YR 4/4) clay; weak fine subangular blocky structure; soft, friable, slightly sticky, moderately plastic; few faint dark red

(10R 3/6) ferriargillans on faces of peds; few fine and medium roots; common fine tubular and few fine irregular pores; about 2 percent, by volume, ironstone pebbles; neutral; very abrupt irregular boundary.

Cr—47 to 82 inches; highly fractured, slightly weathered serpentinite bedrock.

R—82 inches; hard, consolidated serpentinite bedrock.

Range in Characteristics

Thickness of the solum: 16 to 32 inches

Depth to bedrock: 40 to 55 inches

Content of iron-manganese concretions: Less than 15 percent, by volume, throughout

Reaction: Very strongly acid or strongly acid in the Oi and A horizons, moderately acid or slightly acid in the upper part of the Bo horizon, and slightly acid or neutral in the lower part of the Bo horizon and in the BC horizon

Oi horizon:

Color—hue of 7.5YR or 10YR, value of 2 or 2.5, and chroma of 1 or 2

Texture—mucky peat or muck

A horizon:

Color—hue of 10R or 2.5YR, value of 3, and chroma of 3 or 4

Texture—clay

Bo horizon (upper part):

Color—hue of 10R or 2.5YR, value of 3, and chroma of 3 or 4

Texture—clay

Bo horizon (lower part):

Color—hue of 10R or 2.5YR, value of 3, and chroma of 3 to 6

Texture—clay

BC horizon:

Color—hue of 10R to 7.5YR, value of 3 or 4, and chroma of 2 to 6

Texture—clay loam or clay

C horizon (where present):

Color—no dominant color; multicolored in shades of red, brown, and yellow

Texture—clay loam

Cr horizon:

Type of paralithic contact—hard, fractured, slightly weathered serpentinite that can be excavated with difficulty using hand tools and is rippable by mechanical equipment

R layer:

Type of bedrock—hard, fractured, consolidated serpentinite bedrock

Jácana Series

Depth class: Moderately deep

Drainage class: Well drained

Permeability: Moderately slow

Parent material: Colluvium and residuum of mixed origin overlying basic volcanic rock

Landscape: Uplands and foothills

Landform: Hillslopes and alluvial fans

Commonly associated soils: Aguilita, Coamo, Descalabrado, Fraternidad, Guanábano, Mariana, Palmarejo, and Pozo Blanco soils

Slope: 0 to 12 percent

Taxonomic class: Fine, mixed, superactive, isohyperthermic Vertic Haplustolls

Typical Pedon

Jácana clay, 5 to 12 percent slopes; about 0.5 mile west of the community of Lluveras from the intersection of Puerto Rico Highways 121 and 332; about 600 feet east of a dirt road, in a pasture; Sabana Grande Municipality; USGS Quadrangle Sabana Grande (1966); lat. 18 degrees 2 minutes 20 seconds N. and long. 66 degrees 55 minutes 7 seconds W.

A1—0 to 4 inches; dark brown (7.5YR 3/3) clay; strong medium and coarse granular structure; slightly hard, firm, sticky, plastic; common fine roots; common fine vesicular pores; many 1- to 2-centimeter wide surface cracks; about 2 percent, by volume, pebbles; slightly alkaline.

A2—4 to 20 inches; dark brown (10YR 3/3) clay; moderate medium and coarse subangular blocky structure; slightly hard, firm, sticky, plastic; common faint pressure faces on surfaces of peds; few fine roots; common fine and medium interstitial and few medium and coarse tubular pores; about 2 percent, by volume, pebbles; slightly alkaline.

Bw1—20 to 27 inches; dark brown (7.5YR 3/3) clay; weak medium and coarse subangular blocky structure; slightly hard, firm, sticky, plastic; common distinct pressure faces on surfaces of peds; few fine roots; few fine interstitial and few medium tubular pores; about 2 percent, by volume, pebbles; moderately alkaline.

Bw2—27 to 30 inches; dark yellowish brown (10YR 3/4) clay; few fine very pale brown (10YR 7/4) pockets of parent material; weak medium subangular blocky structure; slightly hard, firm, sticky, plastic; few faint pressure faces on surfaces of peds; few fine interstitial pores; moderately alkaline.

BC—30 to 33 inches; dark yellowish brown (10YR 3/4) clay loam; massive; slightly hard, friable, slightly sticky, plastic; few fine interstitial pores; about 5 percent, by volume, pebbles; moderately alkaline.

Cr—33 inches; weathered, semiconsolidated, bedded volcanic rock.

Range in Characteristics

Thickness of the solum: 24 to 39 inches

Depth to bedrock: 24 to 39 inches

Content (by volume) and size of rock fragments: Less than 15 percent throughout, mostly pebbles

Reaction: Slightly alkaline or moderately alkaline throughout

A or Ap horizon:

Color—hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 to 3

Texture—clay

AB horizon (where present):

Color—hue of 5YR to 10YR, value of 2 or 3, and chroma of 2 or 3

Texture—clay

Bw horizon:

Color—hue of 7.5YR or 10YR, value of 2 to 4, and chroma of 2 to 4

Texture—clay

BC horizon:

Color—hue of 5YR to 10YR, value of 3 to 6, and chroma of 2 to 4

Texture—clay loam

C horizon (where present):

Color—hue of 10YR, value of 3 to 5, and chroma of 3 or 4

Texture—sandy loam

Cr layer:

Type of paralithic contact—highly weathered, semiconsolidated, bedded volcanic rock that can be excavated with difficulty using hand tools and is rippable by mechanical equipment

Joyuda Series

Depth class: Very deep

Drainage class: Very poorly drained

Permeability: Moderate

Parent material: Decomposed organic material

Landscape: Coastal plains

Landform: Salt marshes

Commonly associated soils: Atolladero, Bajura, Cataño, and Guanajibo soils

Slope: 0 to 2 percent

Taxonomic class: Euic, isohyperthermic Hydric Haplohemists

Typical Pedon

Joyuda soil in an area of Joyuda, Atolladero, and Bajura soils, very frequently flooded; about 1.5 miles northwest of Punta Arenas from the intersection of Puerto Rico Highways 100 and 311; about 0.4 mile southeast of Puerto Rico Highway 102; about 600 feet east of the Atolladero lagoon and 400 feet west of the Joyuda lagoon, in an area of wildlife habitat; Cabo Rojo Municipality; USGS Mayagüez topographic quadrangle (1964); lat. 18 degrees 8 minutes 0 seconds N. and long. 67 degrees 10 minutes 56 seconds W.

Oa—0 to 4 inches; mucky peat, black (10YR 2/1) rubbed; about 12 percent fiber rubbed; massive; very friable, slightly sticky, slightly plastic; many fine to coarse roots; neutral; diffuse smooth boundary.

Oe—4 to 80 inches; muck, greenish black (10Y 2.5/1) rubbed; about 35 percent fiber rubbed; massive; very friable, slightly sticky, slightly plastic; moderately alkaline.

Range in Characteristics

Thickness of the solum: More than 80 inches of organic material

Reaction: Neutral to moderately alkaline throughout

Oa horizon:

Color—hue of 10YR, value of 2, and chroma of 1

Texture—muck or mucky peat

Content of fiber—10 to 15 percent rubbed

Oi horizon (where present):

Color—hue of 10YR, value of 3, and chroma of 1

Texture—muck or mucky peat

Content of fiber—75 to 90 percent rubbed

Oe horizon:

Color—hue of 5BY or 10Y, value of 2.5 or 3, and chroma of 1 or 2; or neutral in hue and value of 2.5 or 3

Texture—muck

Content of fiber—25 to 35 percent rubbed

La Covana Series

Depth class: Shallow

Drainage class: Well drained

Permeability: Very slow

Parent material: Material that weathered from limestone bedrock

Landscape: Hills

Landform: Ridges and hillslopes

Commonly associated soils: Altamira, Costa, Pitahaya, and Seboruco soils

Slope: 12 to 40 percent

Taxonomic class: Clayey-skeletal, carbonatic, isohyperthermic Calcic Lithic Petrocalcids

Typical Pedon

La Covana gravelly clay (fig. 27) in an area of La Covana-Limestone outcrop-Seboruco complex, 12 to 40 percent slopes; about 0.7 mile northwest of the headquarters of Borinquen Camp-Dry State Forest of Guánica; about 0.25 mile east on Las Covanas dirt road from its intersection with Puerto Rico Highway 334, in forestland; Guánica Municipality; USGS Punta Verraco, topographic quadrangle (1966); lat. 17 degrees 59 minutes 2 seconds N. and long. 66 degrees 52 minutes 37 seconds W.

A—0 to 5 inches; dark reddish brown (5YR 3/2) gravelly clay; weak medium granular structure; soft, very friable, nonsticky, nonplastic; many very fine, fine, medium, and coarse roots; few very fine interstitial pores; about 25 percent, by volume, pebbles; slightly effervescent; slightly alkaline; clear wavy boundary.

Bk—5 to 19 inches; yellowish red (5YR 5/6) extremely gravelly clay; massive; soft, very friable, sticky, plastic; many fine and medium roots; common very fine interstitial pores; about 70 percent, by volume, pebbles and 5 percent cobbles; many fine calcium carbonate concretions; strongly effervescent; moderately alkaline; abrupt wavy boundary.

Bkm—19 to 31 inches; very pale brown (10YR 8/3) indurated petrocalcic material; massive; extremely hard, extremely firm, brittle; common medium and coarse roots between cracks; violently effervescent; moderately alkaline; gradual broken boundary.

C1—31 to 44 inches; very pale brown (10YR 8/3) silt loam; massive; slightly hard, friable, slightly sticky, slightly plastic; many very fine and common fine roots; common very fine interstitial pores; common distinct yellow (10YR 7/8) relic mottles; many fine and medium calcium carbonate concretions; violently effervescent; moderately alkaline; gradual irregular boundary.

C2—44 to 80 inches; very pale brown (10YR 8/2) silt loam; massive; slightly hard, friable, slightly sticky, slightly plastic; few very fine and fine roots; many very fine interstitial and few very fine tubular pores; many prominent yellow (10YR 7/8) relic mottles; common fine calcium carbonate concretions; violently effervescent; moderately alkaline.

Range in Characteristics

Thickness of the solum: 6 to 20 inches

Depth to lithic contact: 6 to 20 inches

Content (by volume) and size of rock fragments: 20 to 60 percent pebbles in the A horizon and 50 to 80 percent pebbles in the Bk horizon

Reaction: Moderately alkaline throughout

A or Ap horizon:

Color—hue of 10R to 10YR, value of 2 or 3, and chroma of 1 or 2

Texture in the fine-earth fraction—loam, silty clay loam, clay loam, or silty clay

Bk horizon:

Color—hue of 10R to 5YR, value of 2.5 to 5, and chroma of 2 to 6

Texture in the fine-earth fraction—silty clay loam, clay loam, silty clay, or clay

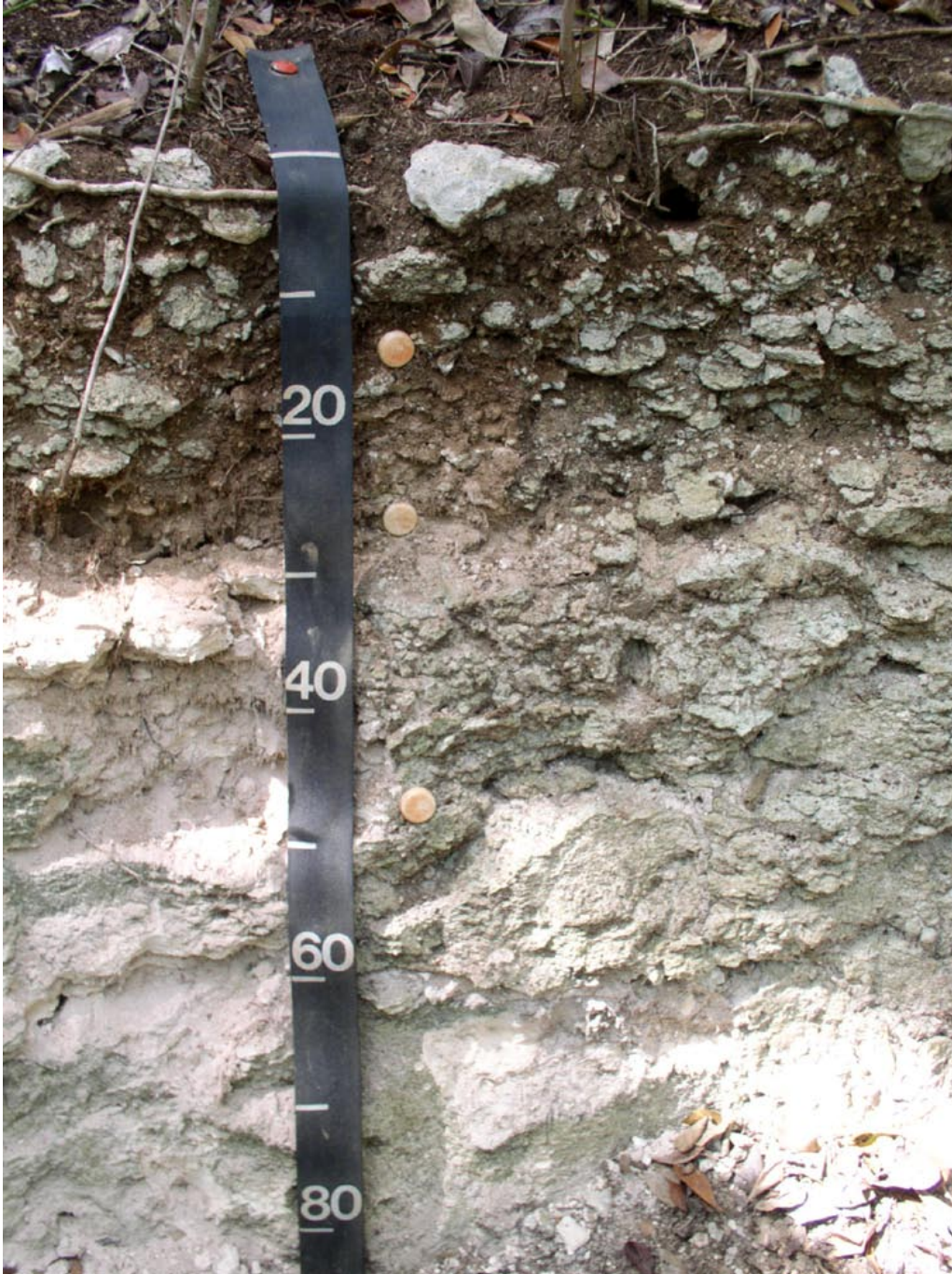


Figure 27.—Profile of a La Covana soil in an area of La Covana-Limestone outcrop-Seboruco complex, 12 to 40 percent slopes. La Covana soils are characterized by a surface layer of gravelly clay and an indurated subsurface layer of calcium carbonate over a substratum of silty loam. They are in the aridic soil moisture regime.

Bkm horizon:

Color—hue of 10YR, value of 8, and chroma of 3

Texture—indurated, petrocalcic material that can not be excavated with hand tools but is rippable by mechanical equipment

C horizon:

Color—hue of 7.5YR or 10YR, value of 6 to 8, and chroma of 2 to 6; none to common relic mottles in shades of brown and yellow

Texture—silt loam or silty clay loam

Calcium carbonate—few to many concretions

La Luna Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderate

Parent material: Alluvial deposits of mixed origin

Landscape: River valleys

Landform: Flood plains

Commonly associated soils: Cortada, San Antón, and Vayas soils

Slope: 0 to 2 percent

Taxonomic class: Fine-loamy, mixed, active, isohyperthermic Typic Calciargids

Typical Pedon

La Luna silty clay loam, 0 to 2 percent slopes, occasionally flooded; about 0.4 mile north of the city of Guánica from the intersection of Puerto Rico Highways 331 and 332; about 1,000 feet west of Puerto Rico Highway 332, in a cash-crop plantation; Guánica Municipality; USGS Guánica topographic quadrangle (1966); lat. 17 degrees 58 minutes 55 seconds N. and long. 66 degrees 54 minutes 38 seconds W.

Ap—0 to 11 inches; very dark grayish brown (10YR 3/2) silty clay loam; moderate fine and medium granular structure; hard, friable, slightly sticky, moderately plastic; few very fine and fine roots; many very fine to medium interstitial pores; about 8 percent, by volume, pebbles; noneffervescent; slightly alkaline; clear smooth boundary.

Bt—11 to 20 inches; very dark grayish brown (2.5Y 3/2) silty clay loam; strong fine and medium subangular blocky structure; hard, firm, slightly sticky, moderately plastic; few very fine and fine roots; common very fine irregular and few very fine tubular pores; common fine very dark gray (2.5Y 3/1) clay films on faces of peds; slightly effervescent; slightly alkaline; clear smooth boundary.

Btk1—20 to 32 inches; very dark grayish brown (2.5Y 3/2) silty clay; strong fine and medium subangular blocky structure; hard, firm, slightly sticky, moderately plastic; few very fine and fine roots; common very fine and fine irregular and tubular pores; common faint very dark gray (2.5Y 3/1) clay films on faces of peds; many very fine and fine light yellowish brown (2.5Y 6/3) masses of secondary calcium carbonate; slightly effervescent; moderately alkaline; abrupt smooth boundary.

Btk2—32 to 44 inches; olive brown (2.5Y 4/3) silty clay loam; moderate fine and medium subangular blocky structure; hard, firm, slightly sticky, moderately plastic; few very fine roots; few very fine and fine irregular and many very fine to medium tubular pores; common faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; many very fine and fine light yellowish brown (2.5Y 6/3) masses of secondary calcium carbonate; slightly effervescent; moderately alkaline; clear smooth boundary.

Btk3—44 to 58 inches; dark grayish brown (2.5Y 4/2) silty clay loam; weak very fine and fine subangular blocky structure; slightly hard, firm, slightly sticky, moderately plastic; few very fine roots; few very fine and fine irregular and common very fine to medium tubular pores; common faint dark grayish brown (2.5Y 4/2) clay films on faces of peds; common very fine and fine light yellowish brown (2.5Y 6/3) masses of secondary calcium carbonate; slightly effervescent; moderately alkaline; clear smooth boundary.

C—58 to 75 inches; dark grayish brown (2.5Y 4/2) silty clay loam; massive; slightly hard, friable, slightly sticky, slightly plastic; few very fine roots; common very fine and fine irregular and tubular pores; common very fine and fine brown (10YR 4/3) masses of iron accumulation; few very fine and fine light yellowish brown (2.5Y 6/3) masses of calcium carbonate; slightly effervescent; moderately alkaline.

Range in Characteristics

Thickness of the solum: 26 to 48 inches

Content (by volume) and size of rock fragments: 0 to less than 10 percent pebbles throughout

Reaction: Slightly alkaline in the A or Ap horizon and in the Bt horizon and moderately alkaline in the rest of the profile

A or Ap horizon:

Color—hue of 10YR or 2.5Y, value of 3, and chroma of 1 or 2

Texture—clay loam, silty clay loam, or silty clay

Bt horizon:

Color—hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3

Texture—clay loam, silty clay loam, or silty clay

Btk horizon:

Color—hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 or 3

Texture—clay loam, silty clay loam, or silty clay

C horizon:

Color—hue of 10YR to 5Y, value of 3 or 4, and chroma of 1 to 6

Texture—sandy clay loam, clay loam, or silty clay loam

La Taína Series

Depth class: Shallow

Drainage class: Well drained

Permeability: Moderately slow

Parent material: Colluvium and residuum that weathered from serpentinite bedrock

Landscape: Serpentine hills and mountains

Landform: Ridges, hillslopes, and mountain slopes

Commonly associated soils: El Cacique, Maresúa, Nipe, Quebrada, Rosario, and Santa Marta soils

Slope: 5 to 90 percent

Taxonomic class: Clayey-skeletal, magnesian, isohyperthermic, shallow Typic Argiudolls

Typical Pedon

La Taína very gravelly clay in an area of El Cacique-La Taína complex, 20 to 60 percent slopes; about 1.7 miles northeast of downtown San Germán; about 0.5 mile southeast from the intersection of Puerto Rico Highways 2 and 362; about 100 feet northeast of Puerto Rico Highway 2, in pastureland; San Germán Municipality; USGS San Germán topographic quadrangle (1966); lat. 18 degrees 5 minutes 3 seconds N. and long. 67 degrees 1 minute 7 seconds W.

Ap—0 to 8 inches; very dark brown (10YR 2/2) very gravelly clay; moderate fine subangular blocky structure parting to moderate fine granular; slightly hard, friable, slightly sticky, slightly plastic; many fine and medium and few coarse roots; common fine interstitial pores; about 40 percent, by volume, pebbles; noneffervescent; neutral; clear smooth boundary.

Bt1—8 to 13 inches; dark reddish brown (5YR 3/2) extremely gravelly clay; moderate fine subangular blocky structure parting to weak fine granular; slightly hard, firm,

sticky, plastic; common fine and medium roots; common fine interstitial and few fine tubular pores; few faint clay films on faces of peds; about 60 percent, by volume, pebbles, and 10 percent cobbles; noneffervescent; neutral; clear smooth boundary.

Bt2—13 to 17 inches; dark reddish brown (5YR 3/2) extremely paragravelly clay loam; weak fine subangular blocky structure; slightly hard, firm, sticky, plastic; common fine and medium roots; common fine interstitial pores; common faint clay films on faces of peds; about 75 percent, by volume, parapebbles and 10 percent paracobbles; noneffervescent; neutral; abrupt smooth boundary.

Cr—17 to 29 inches; highly fractured serpentinite bedrock.

R—29 inches; hard, consolidated serpentinite bedrock.

Range in Characteristics

Thickness of the solum: 10 to 20 inches

Depth to bedrock: 11 to 20 inches

Content (by volume) and size of rock fragments: 8 to 65 percent pebbles and cobbles in the A horizon and from 60 to 85 percent pebbles and cobbles in the Bt horizon

Reaction: Neutral throughout

Ap horizon:

Color—hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 2 or 3

Texture in the fine-earth fraction—clay loam or clay

Bt horizon:

Color—hue of 5YR or 7.5YR, value of 3, and chroma of 2 or 3

Texture in the fine-earth fraction—clay loam or clay

Cr horizon:

Type of paralithic contact—highly fractured serpentinite that can be excavated with difficulty using hand tools and is rippable by mechanical equipment

R layer:

Type of bedrock—hard, consolidated serpentinite bedrock

La Tea Series

Depth class: Shallow

Drainage class: Well drained

Permeability: Slow

Parent material: Colluvium and residuum that weathered from limestone bedrock

Landscape: Limestone hills and mountains

Landform: Ridges, hillslopes, and mountain slopes

Commonly associated soils: Caguabo, Los Peñones, Malaya, and Múcara soils

Slope: 20 to 60 percent

Taxonomic class: Clayey, vermiculitic, isohyperthermic, shallow Typic Argiudolls

Typical Pedon

La Tea very cobbly clay (fig. 28) in an area of La Tea-Limestone outcrop complex, 20 to 60 percent slopes; about 0.6 mile northeast of downtown Hormigueros from the intersection of Puerto Rico Highways 344 and 345; about 0.6 mile northwest from the intersection of Puerto Rico Highways 344 and 346; about 20 feet west of a paved road; in forestland; Hormigueros Municipality; USGS Rosario topographic quadrangle (1964); lat. 18 degrees 5 minutes 52 seconds N. and long. 67 degrees 6 minutes 55 seconds W.

Ap—0 to 5 inches; very dark grayish brown (10YR 3/2) very cobbly clay; strong fine and medium granular structure; slightly hard, firm, sticky, plastic; many very

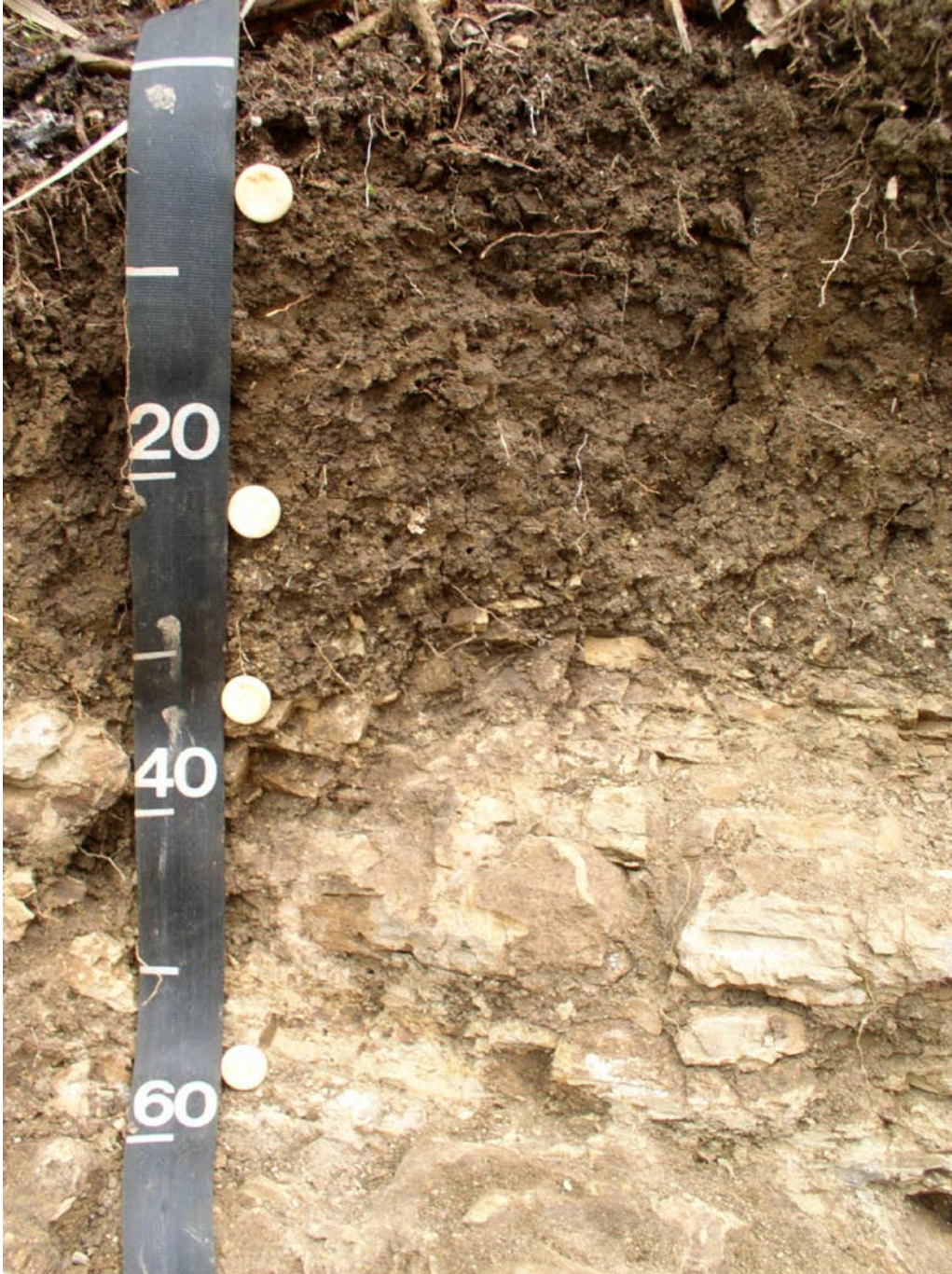


Figure 28.—Profile of a La Tea soil in an area of La Tea-Limestone outcrop complex, 20 to 60 percent slopes. La Tea soils are characterized by a surface layer of very cobbly clay and a subsurface layer of gravelly clay over hard, unweathered limestone bedrock from the Cretaceous period. They are in the udic soil moisture regime.

fine, fine, and medium roots; common fine and medium interstitial pores; about 10 percent, by volume, pebbles, 25 percent cobbles, and 2 percent stones; noneffervescent; neutral; clear smooth boundary.

Bt1—5 to 11 inches; very dark grayish brown (10YR 3/2) gravelly clay; moderate fine subangular blocky structure; hard, firm, sticky, plastic; many very fine, fine,

and medium and few coarse roots; many fine and medium interstitial pores; few faint clay films on faces of peds; about 20 percent, by volume, pebbles; noneffervescent; slightly alkaline; clear wavy boundary.

Bt2—11 to 16 inches; very dark grayish brown (10YR 3/2) paragravelly clay; moderate fine and medium subangular blocky structure; hard, firm, sticky, plastic; many fine and medium and few coarse roots; many fine and medium interstitial pores; common distinct clay films on faces of peds; about 33 percent, by volume, pebbles; slightly effervescent; slightly alkaline; abrupt wavy boundary.

Cr—16 to 18 inches; highly fractured, semiconsolidated limestone that is rippable by hand tools; abrupt irregular boundary.

R—18 inches; hard, consolidated limestone bedrock.

Range in Characteristics

Thickness of the solum: 11 to 18 inches

Depth to bedrock: 14 to 20 inches

Content (by volume) and size of rock fragments: 30 to 45 percent, mostly pebbles and cobbles, in the Ap horizon and 2 to less than 35 percent pebbles in the Bt horizon

Reaction: Slightly alkaline or moderately alkaline throughout

A or Ap horizon:

Color—hue of 10YR, value of 3, and chroma of 1 or 2

Texture in the fine-earth fraction—clay

Bt horizon:

Color—hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4

Texture in the fine-earth fraction—clay

Cr horizon (where present):

Type of paralithic contact—highly fractured, semiconsolidated limestone that can be excavated with difficulty and is rippable with hand tools

R layer:

Type of bedrock—hard, consolidated limestone bedrock

Lares Series

Depth class: Very deep

Drainage class: Somewhat poorly drained

Permeability: Moderately slow

Parent material: Clayey marine deposits

Landscape: Coastal plains

Landform: Alluvial fans and terraces

Commonly associated soils: Bajura, Coloso, Dique, Mabí, Maní, Montegrande, Reilly, and Toa soils

Slope: 0 to 5 percent

Taxonomic class: Very-fine, mixed, semiactive, isohyperthermic Aquic Hapludults

Typical Pedon

Lares clay, 0 to 5 percent slopes; about 0.5 mile northeast of downtown Cabo Rojo from the intersection of Puerto Rico Highways 102 and 312; about 200 feet east from a dirt road, in a pasture; Cabo Rojo Municipality; USGS Puerto Real topographic quadrangle (1966); lat. 18 degrees 5 minutes 45 seconds N. and long. 67 degrees 8 minutes 32 seconds W.

Ap—0 to 2 inches; yellowish brown (10YR 5/4) clay; weak fine and medium subangular blocky structure; extremely hard, very firm, sticky, plastic; many fine

- to medium roots; common fine and medium irregular pores; very strongly acid; gradual wavy boundary.
- AB—2 to 5 inches; yellowish red (5YR 4/6) clay; moderate fine and medium subangular blocky structure; extremely hard, very firm, sticky, plastic; many very fine to medium roots; many fine and medium irregular and few very fine tubular pores; few fine faint red (10R 4/8) masses of iron accumulation; very strongly acid; gradual wavy boundary.
- Bt1—5 to 8 inches; yellowish red (5YR 4/6) clay; strong fine to coarse subangular blocky structure; extremely hard, very firm, sticky, plastic; few fine roots; many fine and medium irregular and few fine tubular pores; many prominent clay films on faces of peds; few fine faint red (10R 4/8) masses of iron accumulation; very strongly acid; abrupt smooth boundary.
- Bt2—8 to 18 inches; 34 percent red (10R 4/8), 33 percent red (2.5YR 4/8), and 33 percent strong brown (7.5YR 5/8) clay in a variegated pattern; moderate fine and medium subangular blocky structure; hard, firm, sticky, plastic; few fine roots; many fine and medium irregular and few fine tubular pores; many distinct clay films on faces of peds; very strongly acid; gradual wavy boundary.
- Bt3—18 to 28 inches; 33 percent red (10R 4/8), 33 percent red (2.5YR 4/8), and 34 percent strong brown (7.5YR 5/8) clay in a variegated pattern; weak fine and medium subangular blocky structure; slightly hard, firm, sticky, plastic; few very fine and fine roots; many fine and medium irregular and few fine tubular pores; many continuous distinct clay films on faces of peds; strongly acid; abrupt wavy boundary.
- C—28 to 41 inches; 34 percent reddish yellow (7.5YR 6/8), 33 percent strong brown (7.5YR 5/6), and 33 percent light gray (2.5Y 7/2) clay in a variegated pattern; massive; slightly hard, firm, sticky, plastic; few very fine roots; many very fine irregular and few fine tubular pores; few fine black (7.5YR 2.5/1) iron-manganese concretions; strongly acid; abrupt wavy boundary.
- Cg1—41 to 50 inches; 50 percent reddish yellow (7.5YR 7/6) and 50 percent gray (7.5YR 5/1) clay loam; massive; soft, very friable, sticky, plastic; many fine irregular pores; many medium and coarse black (7.5YR 2.5/1) iron-manganese concretions; strongly acid; abrupt wavy boundary.
- Cg2—50 to 65 inches; 34 percent dark yellowish brown (10YR 4/6), 33 percent pale yellow (2.5Y 7/3), and 33 percent gray (10YR 5/1) clay in a variegated pattern; massive; slightly hard, firm, sticky, plastic; common fine and medium irregular and few fine tubular pores; strongly acid; gradual smooth boundary.
- Cg3—65 to 82 inches; 50 percent dark yellowish brown (10YR 4/6) and 50 percent dark gray (10YR 4/1) clay loam; massive; slightly hard, firm, sticky, plastic; many fine and medium irregular pores; few fine black (10YR 2/1) iron-manganese concretions; strongly acid.

Range in Characteristics

Thickness of the solum: 25 to more than 60 inches

Content (by volume) and size of rock fragments: 0 to less than 10 percent pebbles throughout

Reaction: Very strongly acid or strongly acid in the A or Ap horizon, except where limed; very strongly acid to slightly acid in the Bt and C horizons

A or Ap horizon:

Color—hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 to 6

Texture—clay loam or clay

Redoximorphic features—none to few masses of iron accumulation in shades of red

Bt horizon:

Color—hue of 5YR to 10YR, value of 4 to 7, and chroma of 4 to 6; or no dominant color and multicolored in shades of red and brown

Texture—clay loam or clay

Redoximorphic features—few to many masses of iron accumulation in shades of red, brown, yellow, and gray

BC horizon (where present):

Color—hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 3 to 6

Texture—clay loam or clay

Redoximorphic features—few to many masses of iron accumulation in shades of red and brown; common or many iron depletions in shades of green and gray

C horizon (where present):

Color—hue of 7.5YR or 10YR, value of 4 to 7, and chroma of 3 to 6; or no dominant color and multicolored in shades of red, brown, yellow, and gray

Texture—clay loam or clay

Cg horizon:

Color—hue of 7.5YR or 10YR, value of 4 to 7, and chroma of 1 or 2; or no dominant color and multicolored in shades of red, brown, yellow, and gray with at least 50 percent gray

Texture—clay loam or clay

Llanos Costa Series

Depth class: Very deep (fig. 29)

Drainage class: Well drained

Permeability: Moderate

Parent material: Gravelly sediments that weathered from basalt, chert, and rhyolite

Landscape: Uplands

Landform: Alluvial fans and mountain footslopes

Commonly associated soils: Bermeja, Cerro Mariquita, El Papayo, Maguayo, Melones, and Montalva soils

Slope: 0 to 12 percent

Taxonomic class: Fine, mixed, semiactive, isohyperthermic Typic Haplargids

Typical Pedon

Llanos Costa loam, 5 to 12 percent slopes; about 3.3 miles west from the intersection of Puerto Rico Highways 303 and 305; about 1.4 miles west of the community of Maguayo on a dirt road; about 80 feet south of the dirt road, in native pasture; Cabo Rojo Municipality; USGS San Germán topographic quadrangle (1966); lat. 18 degrees 7 minutes 46 seconds N. and long. 67 degrees 7 minutes 13 seconds W.

Ap—0 to 9 inches; dark brown (7.5YR 3/4) loam; moderate fine granular structure; soft, friable, slightly sticky, slightly plastic; common very fine roots; about 3 percent, by volume, pebbles; moderately acid; clear wavy boundary.

Bt1—9 to 15 inches; dark reddish brown (5YR 3/4) gravelly clay loam; weak medium subangular blocky structure; slightly hard, friable, sticky, plastic; common very fine roots; common faint clay films on faces of peds; about 30 percent, by volume, pebbles; slightly acid; clear smooth boundary.

Bt2—15 to 29 inches; yellowish red (5YR 4/6) gravelly clay; moderate fine and medium subangular blocky structure; slightly hard, firm, slightly sticky, slightly plastic; few very fine roots; many distinct clay films on faces of peds; about 17 percent, by volume, pebbles and 2 percent cobbles; neutral; gradual smooth boundary.

Bt3—29 to 43 inches; yellowish red (5YR 4/6) very gravelly clay; moderate medium subangular blocky structure; slightly hard, firm, sticky, plastic; few very fine roots;



Figure 29.—Profile of Llanos Costa loam, 2 to 5 percent slopes. Llanos Costa soils are characterized by a surface layer of loam and a subsurface layer of clay loam or clay. They are in the aridic soil moisture regime.

many distinct clay films on faces of peds; about 43 percent, by volume, pebbles and 2 percent cobbles; slightly acid; clear wavy boundary.

Bt4—43 to 56 inches; 75 percent strong brown (7.5YR 4/6) and 25 percent yellowish red (5YR 4/6) very gravelly sandy clay loam; weak medium subangular blocky structure; slightly hard, friable, sticky, plastic; few very fine roots; many distinct clay films on faces of peds; about 38 percent, by volume, pebbles; moderately acid; gradual wavy boundary.

Bt5—56 to 68 inches; yellowish red (5YR 4/6) very gravelly sandy clay loam; weak medium subangular blocky structure; slightly hard, friable, sticky, plastic; common distinct clay films on faces of peds; about 46 percent, by volume, pebbles; moderately acid; gradual wavy boundary.

Bt6—68 to 80 inches; yellowish red (5YR 4/6) gravelly sandy clay loam; weak medium subangular blocky structure; slightly hard, friable, sticky, plastic; common distinct clay films on faces of peds; about 34 percent, by volume, pebbles; moderately acid.

Range in Characteristics

Thickness of the solum: More than 60 inches

Content (by volume) and size of rock fragments: Less than 15 percent pebbles in the A or Ap horizon; 15 to 50 percent pebbles in the upper part of the Bt horizon, averaging less than 35 percent in the control section; and 20 to 75 pebbles in the lower part of the Bt horizon

Reaction: Strongly acid to neutral throughout

A or Ap horizon:

Color—hue of 5YR to 10YR, value of 3 or 4, and chroma of 2 to 4

Texture—loam, clay loam, or clay

Bt horizon (upper part):

Color—hue of 2.5YR to 10YR, value of 3 or 4, and chroma of 4 to 8

Texture—clay loam, clay, or their gravelly analogs

Bt horizon (lower part):

Color—hue of 2.5YR to 10YR, value of 3 or 4, and chroma of 4 to 8

Texture—sandy clay loam, clay loam, or their gravelly to extremely gravelly analogs

Los Peñones Series

Depth class: Very shallow

Drainage class: Well drained

Permeability: Rapid

Parent material: Organic material overlying unweathered limestone

Landscape: Hills

Landform: Ridges and hillslopes

Commonly associated soils: La Tea

Slope: 60 to 90 percent

Taxonomic class: Euic, isohyperthermic Lithic Udifolists

Typical Pedon

Los Peñones soil in an area of Los Peñones-Limestone outcrop complex, 60 to 90 percent slopes; about 0.9 mile southeast from downtown El Poblado Rosario on Puerto Rico Highway 348 and about 200 feet south of Puerto Rico Highway 348, on the Los Peñones formation, in an area of wildlife habitat; San Germán Municipality; USGS Rosario topographic quadrangle (1964); lat. 18 degrees 9 minutes 13 seconds N. and long. 67 degrees 4 minutes 12 seconds W.

Oe—0 to 8 inches; black (10YR 2/1) mucky peat, very dark brown (10YR 2/2) crushed and rubbed; about 70 percent fiber unrubbed and 30 percent rubbed; massive; soft, friable, nonsticky, nonplastic; many very fine, fine, and medium and few coarse roots; moderately alkaline; abrupt wavy boundary.

R—8 inches; hard, consolidated limestone bedrock from the Cretaceous Period (Peñones limestone).

Range in Characteristics

Thickness of the solum: 2 to 15 inches

Depth to bedrock: Less than 15 inches

Reaction: Moderately alkaline in the histic epipedon

Oe horizon:

Color—hue of 10YR or 2.5Y, value of 2.5 or 2, and chroma of 1

R layer:

Type of bedrock—unweathered Peñones limestone bedrock from the Cretaceous Period

Mabí Series

Depth class: Very deep

Drainage class: Somewhat poorly drained

Permeability: Slow

Parent material: Alluvium and colluvium of mixed origin

Landscape: Coastal plains

Landform: Alluvial fans and terraces

Commonly associated soils: Cataño, Coloso, Lares, Montegrando, and Toa soils

Slope: 2 to 5 percent

Taxonomic class: Very-fine, mixed, active, isohyperthermic Aquic Hapluderts

Typical Pedon

Mabí clay, 2 to 5 percent slopes, rarely flooded; about 0.65 mile southwest from the intersection of Puerto Rico Highways 368 and 121; about 0.4 mile southwest from the Sabana Grande Water Treatment Plant, in pastureland; Sabana Grande Municipality; USGS Sabana Grande topographic quadrangle (1966); lat. 18 degrees 4 minutes 14 seconds N. and long. 66 degrees 58 minutes 3 seconds W.

Ap—0 to 7 inches; black (2.5Y 2.5/1) clay; moderate fine and medium subangular blocky structure; slightly hard, firm, slightly sticky, moderately plastic; common very fine and fine roots; common fine irregular pores; noneffervescent; moderately acid; clear smooth boundary.

Bss1—7 to 16 inches; very dark gray (2.5Y 3/1) clay; moderate fine and medium angular blocky structure; hard, firm, slightly sticky, moderately plastic; few intersecting slickensides having polished and grooved surfaces; few fine roots; common fine and medium irregular pores; few fine prominent yellowish red (5YR 5/8) masses of iron accumulation on surfaces along root channels; noneffervescent; moderately acid; clear wavy boundary.

Bss2—16 to 32 inches; very dark gray (10YR 3/1) clay; moderate fine and medium angular blocky structure; hard, firm, slightly sticky, moderately plastic; common intersecting slickensides having polished and grooved surfaces; few fine roots; common fine and medium irregular pores; common fine and medium prominent strong brown (7.5YR 5/6) masses of iron accumulation; many fine and medium prominent olive gray (5Y 4/2) iron depletions; noneffervescent; slightly acid; diffuse smooth boundary.

Bss3—32 to 41 inches; very dark gray (10YR 3/1) clay; moderate medium and coarse angular blocky structure; hard, firm, slightly sticky, moderately plastic; common intersecting slickensides having polished and grooved surfaces; few fine roots; common fine and medium irregular pores; common fine and medium prominent strong brown (7.5YR 5/8) masses of iron accumulation; noneffervescent; neutral; clear wavy boundary.

Bss4—41 to 50 inches; black (N 2.5/0) clay; moderate medium and coarse angular blocky structure; very hard, very firm, slightly sticky, moderately plastic; common intersecting slickensides having polished and grooved surfaces; few fine roots; common fine and medium irregular and few fine tubular pores; few fine and medium prominent yellowish red (5YR 4/6) masses of iron accumulation; noneffervescent; neutral; clear wavy boundary.

Bgss1—50 to 59 inches; dark grayish brown (2.5Y 4/2) clay; weak fine and medium angular blocky structure; very hard, very firm, slightly sticky, moderately plastic; few fine iron-manganese masses; common intersecting slickensides having polished and grooved surfaces; few fine roots; few fine and medium irregular pores; many fine prominent strong brown (7.5YR 5/8) masses of iron accumulation; common fine and medium prominent olive gray (5Y 5/2) iron depletions; noneffervescent; slightly alkaline; diffuse smooth boundary.

Bgss2—59 to 74 inches; dark grayish brown (2.5Y 4/2) clay; weak fine and medium angular blocky structure; very hard, very firm, slightly sticky, moderately plastic; common fine iron-manganese masses; few fine iron-manganese concretions; common intersecting slickensides having polished and grooved surfaces; few fine roots; few fine and medium irregular pores; many fine prominent strong brown (7.5YR 5/8) masses of iron accumulation; common fine and medium prominent olive gray (5Y 5/2) iron depletions; noneffervescent; slightly alkaline.

Range in Characteristics

Thickness of the solum: More than 60 inches

Content (by volume) and size of rock fragments: 0 to 10 percent pebbles, throughout

Reaction: Strongly acid to neutral in the A or Ap horizon, moderately acid to slightly alkaline in the Bss horizon, and slightly alkaline or moderately alkaline in the Bgss horizon

A or Ap horizon:

Color—hue of 10YR to 5Y, value of 2 to 4, and chroma of 1 or 2

Texture—clay

Redoximorphic features—none to few masses of iron accumulation in shades of red and brown

Upper part of the Bss horizon:

Color—hue of 10YR to 5Y, value of 2.5 to 5, and chroma of 1 to 6

Texture—clay

Redoximorphic features—common or many masses of iron accumulation in shades of red, brown, and yellow and few to many iron depletions in shades of gray

Iron-manganese masses and concretions—few to many

Lower part of the Bss horizon and the Bkss horizon, (where present):

Color—hue of 10YR to 5Y, value of 2.5 to 5, and chroma of 1 to 4; or neutral in hue and value of 2.5

Texture—clay

Redoximorphic features—common or many masses of iron accumulation in shades of red, brown, and yellow and few to many iron depletions in shades of gray

Iron-manganese masses and concretions—few or common

Bgss horizon:

Color—hue of 2.5Y to 10Y, value of 1 to 4, and chroma of 1 or 2

Texture—clay

Redoximorphic features—common or many masses of iron accumulation in shades of brown

Clay depletions—few or common in shades of gray

Iron-manganese masses and concretions—few or common

Bw horizon (where present):

Color—hue of 2.5Y, value of 4 or 5, and chroma of 3 or 4

Texture—clay

Redoximorphic features—few or common masses of iron accumulation in shades of brown

Iron-manganese masses and concretions—few or common

Maguayo Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Slow

Parent material: Material that weathered from volcanic rock and limestone

Landscape: Uplands

Landform: Alluvial fans

Commonly associated soils: Bermeja, Cerro Mariquita, Llanos Costa, and Melones soils

Slope: 0 to 12 percent

Taxonomic class: Fine, mixed, superactive, isohyperthermic Vertic Calciargids

Typical Pedon

Maguayo very gravelly sandy clay loam, 2 to 12 percent slopes; about 0.2 mile east of the community of Maguayo on Puerto Rico Highway 305; about 50 feet north of the highway, in a pasture; Lajas Municipality; USGS San Germán topographic quadrangle (1966); lat. 18 degrees 0 minutes 43 seconds N. and long. 67 degrees 4 minutes 53 seconds W.

Ap—0 to 6 inches; dark yellowish brown (10YR 3/4) very gravelly sandy clay loam; moderate fine granular structure; soft, friable, nonsticky, nonplastic; many fine roots; about 36 percent, by volume, pebbles; noneffervescent; moderately acid; gradual smooth boundary.

A—6 to 12 inches; dark yellowish brown (10YR 3/4) very gravelly coarse sandy loam; weak fine subangular blocky structure; slightly hard, friable, nonsticky, nonplastic; many fine roots; about 38 percent, by volume, pebbles; noneffervescent; slightly acid; clear smooth boundary.

Bt1—12 to 22 inches; dark yellowish brown (10YR 4/4) clay; moderate medium subangular blocky structure; hard, firm, nonsticky, slightly plastic; many faint clay films on faces of peds; common fine roots; about 12 percent, by volume, pebbles; noneffervescent; neutral; gradual wavy boundary.

Bt2—22 to 35 inches; brown (7.5YR 4/4) clay; weak fine subangular blocky structure; hard, firm, nonsticky, slightly plastic; many faint clay films on faces of peds; few fine roots; about 12 percent, by volume, pebbles; slightly effervescent; slightly alkaline; gradual wavy boundary.

Bkss1—35 to 48 inches; brown (7.5YR 5/4) clay; massive parting to weak medium subangular blocky structure; hard, firm, nonsticky, plastic; few slickensides having distinct polished and grooved surfaces; few fine roots; about 9 percent, by volume, pebbles; common medium prominent very pale brown (10YR 8/3) soft masses and

threads of calcium carbonate; strongly effervescent; slightly alkaline; gradual wavy boundary.

Bkss2—48 to 65 inches; strong brown (7.5YR 5/6) clay; massive parting to weak medium subangular blocky structure; hard, friable, nonsticky, plastic; few slickensides having distinct polished and grooved surfaces; about 12 percent, by volume, pebbles; common medium prominent very pale brown (10YR 8/3) soft masses and threads of calcium carbonate; strongly effervescent; moderately alkaline.

Range in Characteristics

Thickness of the solum: 40 to 60 inches

Content (by volume) and size of rock fragments: 10 to 38 percent pebbles in the A and Ap horizons; 0 to less than 15 percent pebbles in the Bt and Bkss horizons; and 35 to more than 75 percent pebbles in the 2C horizon, where present

Reaction: Moderately acid to slightly alkaline in the A and Ap horizons; slightly acid to slightly alkaline in the Bt horizon; and neutral to moderately alkaline in the Bkss horizon and in the 2C horizon, where present

A and Ap horizons:

Color—hue of 7.5YR or 10YR, value of 2 to 4, and chroma of 2 to 4

Texture in the fine-earth fraction—sandy loam, sandy clay loam, or clay loam

Bt horizon:

Color—hue of 5YR to 10YR, value of 4 or 5, and chroma of 3 to 6

Texture—clay loam or clay

Bkss horizon:

Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8

Texture—clay loam or clay

2C horizon (where present):

Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8

Texture in the fine-earth fraction—clay loam or clay

Malaya Series

Depth class: Shallow

Drainage class: Well drained

Permeability: Moderate

Parent material: Colluvium and residuum that weathered from calcareous tuffaceous bedrock

Landscape: Hills and mountains

Landform: Hillslopes and mountain slopes

Landform position: Summits and side slopes

Commonly associated soils: Caguabo, Guanábano, La Tea, and Múcara soils

Slope: 20 to 60 percent

Taxonomic class: Clayey, mixed, superactive, isohyperthermic, shallow Typic Eutrudepts

Typical Pedon

Malaya clay, 20 to 60 percent slopes; about 2.6 miles northeast of the headquarters of Susua State Forest; about 1.1 miles west of José J. Acosta school on Puerto Rico Highway 371; and about 250 feet north from Lucchetti Lake shore, in naturalized pastureland; Yauco Municipality; USGS Sabana Grande topographic quadrangle (1966); lat. 18 degrees 5 minutes 50 seconds N. and long. 66 degrees 52 minutes 31 seconds W.

- Ap—0 to 4 inches; brown (10YR 4/3) clay; moderate fine and medium granular structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and fine vesicular pores, common fine interstitial pores; about 10 percent, by volume, pebbles; noneffervescent; slightly acid; clear smooth boundary.
- Bw—4 to 10 inches; brown (10YR 4/3) gravelly clay; moderate fine and medium subangular blocky structure; slightly hard, firm, slightly sticky, plastic; common very fine and fine roots; common fine and medium tubular pores, common fine interstitial pores; about 20 percent, by volume, pebbles; noneffervescent; neutral; abrupt wavy boundary.
- Cr1—10 to 14 inches; highly fractured, calcareous tuffaceous rock; noneffervescent; abrupt irregular boundary.
- Cr2—14 to 72 inches; semiconsolidated, calcareous tuffaceous rock; strongly effervescent.

Range in Characteristics

Depth to bedrock: 7 to 20 inches

Content (by volume) and size of rock fragments: 10 to less than 25 percent pebbles in the A or Ap horizon and in the Bw horizon and 10 to less than 35 percent parapebbles in the C horizon, where present

Reaction: Slightly acid to moderately alkaline in the A or Ap horizon and neutral to moderately alkaline in the Bw horizon

A or Ap horizon:

Color—hue of 5YR to 10YR, value of 3 or 4, and chroma of 2 or 3

Texture—clay loam, clay, or their gravelly analogs

Bw horizon:

Color—hue of 5YR to 10YR, value of 3 to 5, and chroma of 2 to 4

Texture—clay loam, clay, or their gravelly analogs

C horizon (where present):

Color—hue of 10YR, value of 4, and chroma of 3 or 4

Texture—clay loam or gravelly clay loam

Cr horizon:

Type of bedrock—semiconsolidated, calcareous tuffaceous rock that can be excavated with difficulty using hand tools and is rippable by mechanical equipment

Manglillo Series

Depth class: Very deep

Drainage class: Very poorly drained

Permeability: Rapid

Parent material: Decomposed organic material overlying regolith consisting of sand-sized shell fragments, quartz grains, and subrounded volcanic fragments on recent beach deposits

Landscape: Coastal plains

Landform: Salt marshes

Commonly associated soils: Boquerón, Serrano, and Teresa soils

Slope: 0 to 1 percent

Taxonomic class: Euic, isohyperthermic Fluvaquentic Haplohemists

Typical Pedon

Manglillo soil in an area of Manglillo, Boquerón, and Serrano soils, very frequently flooded; about 3.7 miles southeast of the community of Pole Ojea from the intersection

of Puerto Rico Highways 301 and 3301; about 1.9 miles south on La Pitahaya road from the intersection of Puerto Rico Highway 303; about 300 feet west of the road, in an area of wildlife habitat; Cabo Rojo Municipality; USGS Cabo Rojo topographic quadrangle (1966); lat. 17 degrees 57 minutes 7 seconds N. and long. 67 degrees 8 minutes 4 seconds W.

- Oa—0 to 5 inches; black (N 2.5/0) muck; massive; very friable, slightly sticky, nonplastic; common medium and coarse roots; strongly effervescent; moderately alkaline; gradual wavy boundary.
- Oi—5 to 24 inches; 50 percent dark brown (10YR 3/3) and 50 percent very dark brown (7.5YR 2.5/3) mucky peat, rubbed; about 95 percent fiber rubbed; massive; very friable, slightly sticky, nonplastic; common medium and coarse roots; strongly effervescent; moderately alkaline; gradual wavy boundary.
- Cg1—24 to 43 inches; very dark greenish gray (10Y 3/1) mucky loam, rubbed; about 50 percent fiber rubbed; massive; very friable, slightly sticky, nonplastic; strongly effervescent; moderately alkaline; abrupt wavy boundary.
- Cg2—43 to 60 inches; 50 percent light greenish gray (10Y 8/1), 25 percent greenish gray (10Y 6/1), and 25 percent greenish gray (5GY 5/1) sandy loam; massive; very friable, nonsticky, nonplastic; about 12 percent, by volume, pebbles; strongly effervescent; moderately alkaline.

Range in Characteristics

Thickness of the solum: 18 to 50 inches of organic material

Content (by volume) and size of rock fragments: 0 to less than 15 percent pebbles in the lower part of the Cg horizon

Reaction: Moderately alkaline throughout

Oa horizon:

Color—hue of 5Y, value of 2.5, and chroma of 1; or neutral in hue and value of 2.5

Texture—muck

Oi horizon:

Color—hue of 7.5YR or 10YR, value of 2.5 or 3, and chroma of 2 or 3

Texture—mucky peat

Content of fiber—75 to over 95 percent rubbed

Upper Cg horizon:

Color—hue of 10Y, value of 3, and chroma of 1

Texture—mucky loam

Content of fiber—25 to 50 percent rubbed

Lower Cg horizon:

Color—hue of 10Y or 5GY, value of 5 to 8, and chroma of 1

Texture—sandy loam

Maní Series

Depth class: Very deep

Drainage class: Somewhat poorly drained

Permeability: Moderately slow

Parent material: Fine textured alluvium of mixed origin

Landscape: River valleys

Landform: Flood plains

Commonly associated soils: Coloso, Dique, Lares, and Toa soils

Slope: 0 to 2 percent

Taxonomic class: Fine, mixed, semiactive, isohyperthermic Fluvaquentic Eutrudepts

Typical Pedon

Maní clay, 0 to 2 percent slopes, occasionally flooded; about 1.7 miles west from the intersection of Puerto Rico Highways 2 and 358; about 2,000 feet northeast of Puerto Rico Highway 114; about 200 feet southwest of an old rail road, in pastureland; Hormigueros Municipality; USGS San Germán topographic quadrangle (1966); lat. 18 degrees 6 minutes 53 seconds N. and long. 67 degrees 5 minutes 59 seconds W.

Ap—0 to 13 inches; brown (10YR 4/3) clay; strong fine and medium subangular blocky structure; slightly hard, firm, slightly sticky, moderately plastic; few fine faint pressure faces on surfaces of peds; common fine roots; common fine and medium irregular pores; neutral; diffuse smooth boundary.

Bw1—13 to 29 inches; brown (10YR 4/3) clay; moderate fine and medium subangular blocky structure; slightly hard, firm, slightly sticky, moderately plastic; few fine faint pressure faces on surfaces of peds; common fine roots; common fine and medium irregular pores; common fine faint yellowish brown (10YR 5/4) masses of iron accumulation; common fine distinct gray (5Y 5/1) and olive gray (5Y 5/2) iron depletions; few fine masses of iron-manganese; slightly alkaline; clear smooth boundary.

Bw2—29 to 41 inches; light olive brown (2.5Y 5/3) clay; weak fine and medium subangular blocky structure; slightly hard, firm, slightly sticky, moderately plastic; few fine faint pressure faces on surfaces of peds; few fine roots; common fine and medium irregular and few fine tubular pores; common fine faint brown (7.5YR 4/4) masses of iron accumulation; common prominent greenish gray (5GY 5/1 and 10Y 5/1) iron depletions; few fine masses of iron-manganese; slightly alkaline; abrupt smooth boundary.

Cg1—41 to 67 inches; light olive gray (5Y 6/2) clay; massive; slightly hard, firm, slightly sticky, moderately plastic; few fine roots; few fine irregular and common fine tubular pores; few prominent strong brown (7.5YR 5/6) masses of iron accumulation; common prominent greenish gray (5GY 5/1 and 10Y 6/1) iron depletions; slightly alkaline; clear smooth boundary.

Cg2—67 to 90 inches; olive gray (5Y 5/2) clay; massive; slightly hard, firm, slightly sticky, moderately plastic; few fine roots; few fine irregular and common fine tubular pores; few prominent strong brown (7.5YR 5/8) masses of iron accumulation; common prominent greenish gray (5GY 5/1 and 10Y 6/1) iron depletions; slightly alkaline.

Range in Characteristics

Thickness of the solum: 20 to 40 inches

Content (by volume) and size of rock fragments: Less than 5 percent pebbles throughout

Reaction: Moderately acid or slightly acid throughout

A or Ap horizon:

Color—hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 to 4

Texture—clay

Redoximorphic features—none to few masses of iron accumulation in shades of brown

Bw horizon:

Color—hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 to 6

Texture—clay

Redoximorphic features—few or common iron depletions in shades of gray and few or common masses of iron accumulation in shades of red and brown

BC horizon (where present):

Color—hue of 2.5Y, value of 4 or 5, and chroma of 3

Texture—clay

Redoximorphic features—few or common iron depletions in shades of gray and few or common masses of iron accumulation in shades of red and brown

Cg horizon:

Color—hue of 10YR to 5Y, value of 4 to 7, and chroma of 1 or 2

Texture—clay

Redoximorphic features—common or many iron depletions in shades of gray and olive and few or common masses of iron accumulation in shades of red, brown, and yellow

Maresúa Series

Depth class: Moderately deep

Drainage class: Well drained

Permeability: Moderate

Parent material: Clayey residuum and colluvium that weathered from serpentinite bedrock

Landscape: Hills and mountains

Landform: Ridges, hillslopes, and mountain slopes

Commonly associated soils: El Cacique, La Taína, Nipe, Rosario, and Santa Marta soils

Slope: 12 to 60 percent

Taxonomic class: Clayey-skeletal, magnesian, isohyperthermic Typic Argiudolls

Typical Pedon

Maresúa gravelly clay loam, 20 to 60 percent slopes; about 0.8 mile northwest of downtown San Germán from the intersection of Puerto Rico Highways 102 and 347; about 0.1 mile north of the Aqueduct paved road at the farm facilities of the Interamerican University-San Germán Campus; about 50 feet east of the road, in forestland; San Germán Municipality; USGS San Germán topographic quadrangle (1966); lat. 18 degrees 5 minutes 34 seconds N. and long. 67 degrees 2 minutes 58 seconds W.

Oi—0 to 1 inch; leaves, needles, twigs, sticks, and bark.

A—1 to 4 inches; very dark grayish brown (10YR 3/2) gravelly clay loam; moderate fine granular structure; slightly hard, firm, slightly sticky, plastic; many very fine, fine, and medium and few coarse roots; many very fine interstitial and vesicular pores; about 29 percent, by volume, pebbles; neutral; clear smooth boundary.

AB—4 to 10 inches; very dark grayish brown (10YR 3/2) extremely gravelly clay loam; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky, plastic; common fine and medium and few coarse roots; common fine interstitial pores and few fine tubular pores; common distinct dark reddish brown (5YR 3/3) stains and coatings on faces of peds and in pores; about 80 percent, by volume, pebbles; neutral; clear smooth boundary.

Bt—10 to 26 inches; dark reddish brown (5YR 3/3) extremely paragravelly clay; weak fine subangular blocky structure; slightly hard, firm, slightly sticky, plastic; many fine and medium roots between paragravel fragments; few very fine irregular pores; common distinct clay films on faces of peds; about 80 percent, by volume, paragravel fragments; neutral; abrupt wavy boundary.

Cr—26 to 46 inches; soft, semiconsolidated serpentinite bedrock that is rippable by hand tools.

R—46 inches; hard, consolidated serpentinite bedrock.

Range in Characteristics

Thickness of the solum: 12 to 26 inches

Depth to bedrock: 40 to 60 inches

Soil Survey of San Germán Area, Puerto Rico

Content (by volume) and size of coarse fragments: 5 to 80 percent pebbles and cobbles in the A and AB horizons and 15 to 90 percent parapebbles and paracobbles in the Bt horizon

Reaction: Neutral throughout

A and AB horizons:

Color—hue of 10YR, value of 2 or 3, and chroma of 1 to 3

Texture—silty clay loam, clay loam, or their gravelly to extremely gravelly analogs

Bt horizon:

Color—hue of 5YR to 10YR, value of 2 or 3, and chroma of 2 or 3

Texture—clay loam, clay, or their paragravelly to extremely paragravelly analogs

Cr layer:

Type of bedrock—soft, semiconsolidated serpentinite bedrock that can be excavated with difficulty using hand tools and is rippable by mechanical equipment

R layer:

Type of bedrock—hard, consolidated serpentinite bedrock

Mariana Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderate

Parent material: Colluvium and residuum that weathered from basalt lava and tuff

Landscape: Hills

Landform: Ridges and hillslopes

Commonly associated soils: Descalabrado, Jácana, and Palmarejo soils

Slope: 12 to 40 percent

Taxonomic class: Fine, mixed, active, isohyperthermic Typic Haplohumults

Typical Pedon

Mariana gravelly clay loam, 20 to 40 percent slopes; about 1.8 miles southwest of the community of Sabana Eneas from the intersection of Puerto Rico Highways 102 and 317; about 0.45 mile northwest from the intersection of Puerto Rico Highways 314 and 312; about 0.4 mile northeast on a dirt road from the end of the pavement of Puerto Rico Highway 312; San Germán Municipality; USGS San Germán topographic quadrangle (1966); lat. 18 degrees 2 minutes 40 seconds N. and long. 67 degrees 4 minutes 48 seconds W.

Ap—0 to 8 inches; brown (7.5YR 4/2) gravelly clay loam; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, moderately plastic; many fine roots; about 27 percent, by volume, pebbles; extremely acid; noneffervescent; clear smooth boundary.

AB—8 to 15 inches; 50 percent dark brown (7.5YR 3/2) and 50 percent dark brown (7.5YR 3/4) gravelly clay loam; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, moderately plastic; common very fine roots; about 23 percent, by volume, pebbles; extremely acid; noneffervescent; clear wavy boundary.

Bt1—15 to 26 inches; 50 percent yellowish red (5YR 5/6) and 50 percent reddish brown (5YR 4/4) clay; moderate fine and medium subangular blocky structure; hard, friable, slightly sticky, moderately plastic; few faint discontinuous clay films on faces of peds; common very fine roots; about 11 percent, by volume, pebbles; extremely acid; noneffervescent; clear wavy boundary.

Bt2—26 to 33 inches; 60 percent strong brown (7.5YR 5/6), 30 percent pinkish gray (7.5YR 7/2), and 10 percent dark yellowish brown (10YR 3/6) clay; weak fine and medium subangular blocky structure; hard, firm, moderately sticky, moderately plastic; few faint discontinuous clay films on faces of peds; few very fine roots; about 9 percent, by volume, pebbles; extremely acid; noneffervescent; gradual wavy boundary.

BC—33 to 50 inches; 60 percent light gray (10YR 7/2), 30 percent strong brown (7.5YR 5/8), and 10 percent dark red (2.5YR 3/6) silty clay; weak medium subangular blocky structure; hard, firm, slightly sticky, moderately plastic; few fine roots; about 6 percent, by volume, pebbles; extremely acid; noneffervescent; gradual wavy boundary.

C—50 to 60 inches; 80 percent white (10YR 8/1) and 20 percent strong brown (7.5YR 5/8) saprolite having a texture of silty clay; massive; extremely hard, firm, slightly sticky, moderately plastic; very few fine roots; extremely acid; noneffervescent.

Range in Characteristics

Thickness of the solum: 16 to 33 inches

Content (by volume) and size of rock fragments: Less than 35 percent pebbles in the A or Ap horizon and in the AB horizon and less than 15 percent pebbles in the Bt horizon and in the BC horizon, where present

Reaction: Very strongly acid to extremely acid throughout.

A or Ap horizon:

Color—hue of 5YR or 7.5YR, value of 3 to 5, and chroma of 2 to 4

Texture in the fine-earth fraction—clay loam or clay

AB horizon (where present):

Color—hue of 7.5YR, value of 3, and chroma of 2 to 4

Texture in the fine-earth fraction—clay loam or clay

Bt horizon:

Color—hue of 10R to 5YR, value of 3 to 7, and chroma of 2 to 8; or no dominant color and multicolored in shades of red, brown, or yellow

Texture—clay loam or clay

BC horizon (where present):

Color—hue of 2.5YR to 10YR, value of 3 to 8, and chroma of 2 to 8; or no dominant color and multicolored in shades of red, brown, or yellow

Texture—clay loam, silty clay loam, or silty clay

C horizon:

Color—no dominant color; multicolored in shades of red, brown, gray, and white.

The low chroma colors are inherited from the parent material and are not due to wetness.

Texture—clay loam, silty clay loam, or silty clay

Maricao Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderate

Parent material: Residuum that weathered from basalt

Landscape: Mountain ranges

Landform: Ridges and mountain slopes

Commonly associated soils: Agüeybaná, Chiquito, Cuchillas, and Rubias soils

Slope: 20 to 90 percent

Taxonomic class: Very-fine, mixed, subactive, isothermic Typic Haplohumults

Typical Pedon

Maricao clay, 20 to 60 percent slopes; about 5.5 miles northeast of the city of Yauco from the intersection of Puerto Rico Highways 128 and 372; about 1,000 feet northeast of Hacienda Mogotes farmstead; about 200 feet east of a dirt road, in a coffee plantation; Guayanilla Municipality; USGS Yauco topographic quadrangle (1966); lat. 18 degrees 7 minutes 0 seconds N. and long. 66 degrees 48 minutes 33 seconds W.

Ap—0 to 5 inches; dark brown (7.5YR 3/4) clay; strong medium and coarse granular structure; slightly hard, firm, slightly sticky, plastic; common fine and medium roots; many fine tubular pores; extremely acid; clear smooth boundary.

AB—5 to 11 inches; dark reddish brown (5YR 3/4) clay; moderate medium and coarse subangular blocky structure; slightly hard, firm, slightly sticky, plastic; common fine and medium and few coarse roots; many fine tubular pores; strongly acid; abrupt smooth boundary.

Bt1—11 to 19 inches; dark reddish brown (5YR 3/4) clay; strong medium and coarse subangular blocky structure; slightly hard, firm, slightly sticky, plastic; few fine and medium and common coarse roots; common fine irregular pores; common distinct clay films on faces of peds; very strongly acid; clear smooth boundary.

Bt2—19 to 29 inches; dark reddish brown (5YR 3/4) clay; moderate coarse subangular blocky structure; slightly hard, friable, slightly sticky, plastic; few fine and medium roots; common fine irregular pores; common distinct clay films on faces of peds; very strongly acid; clear wavy boundary.

BC1—29 to 35 inches; red (2.5YR 4/6) clay; weak medium and coarse subangular blocky structure; slightly hard, friable, slightly sticky, plastic; few fine and medium roots; common fine irregular pores; common faint clay films on faces of peds and in pore linings; common fine iron-manganese concretions; about 10 percent, by volume, saprolite; very strongly acid; clear wavy boundary.

BC2—35 to 46 inches; red (2.5YR 4/6) silty clay loam; weak medium and coarse subangular blocky structure; slightly hard, friable, slightly sticky, plastic; few fine and medium roots; common very fine and fine and few medium and coarse irregular pores; few faint clay films on faces of peds; common fine iron-manganese concretions; about 25 percent, by volume, saprolite; very strongly acid; abrupt irregular boundary.

C—46 to 65 inches; 25 percent red (2.5YR 4/6), 25 percent reddish brown (5YR 4/4), 25 percent yellowish brown (10YR 5/4 and 5/6), and 25 percent brownish yellow (10YR 6/6) saprolite having a texture of clay loam; massive; soft, friable, slightly sticky, plastic; few very fine and fine roots; many very fine and fine, common medium, and few coarse irregular pores; common fine iron-manganese concretions; colors are indicative of parent material and are not redoximorphic features; very strongly acid.

Range in Characteristics

Thickness of the solum: 18 to 41 inches

Content (by volume) and size of rock fragments: Less than 5 percent pebbles

Reaction: Extremely acid to strongly acid in the A and AB horizons and very strongly acid or strongly acid in the Bt, BC, and C horizons

A or Ap horizon:

Color—hue of 5YR or 7.5YR, value of 3 to 5, and chroma of 3 to 6

Texture—clay

AB horizon (where present):

Color—hue of 5YR or 7.5YR, value of 3 or 4, and chroma of 4

Texture—clay

Bt horizon:

Color—hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 3 to 8

Texture—clay

BC horizon (where present):

Color—hue of 2.5YR to 7.5YR, value of 4 or 5, and chroma of 4 to 8

Texture—silty clay or clay

C horizon:

Color—no dominant color; multicolored in shades of red, brown, and yellow

Texture—clay loam, silty clay loam, or silty clay

Melones Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Slow

Parent material: Loamy and clayey, alluvial and marine sediments

Landscape: Coastal plains

Landform: Alluvial fans

Commonly associated soils: Altamira, Guayacán, Llanos Costa, Maguayo, Parguera, and Sosa soils

Slope: 0 to 12 percent

Taxonomic class: Fine, smectitic, isohyperthermic Chromic Calcitrerrets

Typical Pedon

Melones clay, 2 to 12 percent slopes; about 2.7 miles east of the community of El Combate on Puerto Rico Highway 301; at the Cabo Rojo National Wildlife Refuge facilities at Boquerón; about 1.2 miles southwest from the intersection of Puerto Rico Highways 301 and 303; about 100 feet east, in a hayfield; Cabo Rojo Municipality; USGS Cabo Rojo topographic quadrangle (1966); lat. 17 degrees 58 minutes 45 seconds N. and long. 67 degrees 10 minutes 16 seconds W.

Ap—0 to 7 inches; dark brown (10YR 3/3) clay; strong medium granular structure; hard, firm, moderately sticky, moderately plastic; many very fine and fine roots; many very fine interstitial pores; about 7 percent, by volume, pebbles; slightly alkaline; clear wavy boundary.

Btss—7 to 18 inches; brown (10YR 4/3) clay; strong medium angular blocky structure; hard, firm, moderately sticky, moderately plastic; many fine and common medium roots; many very fine and few fine tubular and vesicular pores; common faint intersecting slickensides having polished and grooved surfaces; about 1 percent, by volume, pebbles; slightly alkaline; clear wavy boundary.

Btk1—18 to 37 inches; dark brown (7.5YR 3/4) clay; moderate medium angular blocky structure; hard, firm, sticky, plastic; many fine and common medium roots; many very fine and common fine tubular and vesicular pores; many prominent soft masses of calcium carbonate; about 5 percent, by volume, pebbles; moderately alkaline; gradual wavy boundary.

Btk2—37 to 46 inches; brown (7.5YR 4/4) clay; strong medium subangular blocky structure; hard, firm, sticky, plastic; few medium roots; many very fine and common fine and medium tubular and vesicular pores; common distinct soft masses of calcium carbonate; about 5 percent, by volume, pebbles; moderately alkaline; clear wavy boundary.

Bt1—46 to 66 inches; brown (7.5YR 4/4) clay; moderate medium subangular blocky structure; hard, firm, sticky, plastic; few fine and medium roots; many very fine and common fine tubular and vesicular pores; few faint nonintersecting slickensides

having polished and grooved surfaces; about 3 percent, by volume, pebbles; moderately alkaline; clear wavy boundary.

B't₂—66 to 70 inches; strong brown (7.5YR 4/6) gravelly clay loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine and medium roots; many very fine and common fine tubular and vesicular pores; about 30 percent, by volume, pebbles; moderately alkaline; abrupt wavy boundary.

2C—70 to 80 inches; yellowish brown (10YR 5/6) clay; massive; slightly hard, firm, slightly sticky, slightly plastic; many very fine and few fine tubular and vesicular pores; about 3 percent, by volume, pebbles; moderately alkaline.

Range in Characteristics

Thickness of the solum: More than 60 inches

Content (by volume) and size of rock fragments: Less than 10 percent pebbles in the Ap and Bt horizons; 15 to 60 percent pebbles in the Btk horizon, averaging less than 35 percent in the control section; 0 to 30 percent pebbles in the B't horizon; 35 to 75 percent pebbles and cobbles in the BCk horizon; and less than 15 percent in the C horizon

Reaction: Slightly alkaline or moderately alkaline in the A and Bt horizons and moderately alkaline in the Btk, B't, and C horizons

A or Ap horizon:

Color—hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 3 or 4

Texture—clay loam or clay

Btss horizon:

Color—hue of 10YR, value of 3 to 5, and chroma of 3 to 6

Texture—clay loam or clay

Btk horizon:

Color—hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 3 to 6

Texture—clay loam, clay, or their gravelly or very gravelly analogs

Calcium carbonate—common or many filaments and soft masses

B't horizon:

Color—hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 3 to 7

Texture—sandy clay loam, clay loam, clay, or their gravelly analogs

BCk horizon (where present):

Color—hue of 10YR, value of 4 to 6, and chroma of 3 to 6

Texture—sandy clay loam, clay loam, or their very gravelly or extremely gravelly analogs

C or 2C horizon:

Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8

Texture—clay loam or clay

Montalva Series

Depth class: Moderately deep

Drainage class: Well drained

Permeability: Moderately slow

Parent material: Residuum and colluvium of mixed origin overlying basic volcanic bedrock

Landscape: Uplands and low hills

Landform: Alluvial fans and hillslopes

Commonly associated soils: Costa, El Papayo, Guayacán, Llanos Costa, Parguera, and Pitahaya soils

Slope: 0 to 12 percent

Taxonomic class: Fine, mixed, superactive, isohyperthermic Typic Haplotorrerts

Typical Pedon

Montalva clay, 0 to 5 percent slopes; about 2.3 miles west from the intersection of Puerto Rico Highways 116 and 332; about 0.3 mile northeast from the intersection of Puerto Rico Highway 116 and business Puerto Rico Highway 116; about 1,200 feet northwest of Puerto Rico Highway 116, on a dirt road; Guánica Municipality; USGS Guánica topographic quadrangle (1966); lat. 17 degrees 58 minutes 45 seconds N. and long. 66 degrees 56 minutes 34 seconds W.

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) clay; strong fine and medium subangular blocky structure; hard, firm, slightly sticky, very plastic; common very fine and fine roots; common very fine and fine irregular pores; few faint pressure faces on all faces of peds; less than 2 percent, by volume, pebbles; neutral; clear wavy boundary.

Bss1—6 to 16 inches; dark brown (7.5YR 3/2) clay; moderate fine to coarse angular blocky structure; very hard, very firm, slightly sticky, very plastic; common fine and medium roots; common fine and medium irregular pores; many prominent pressure faces on all faces of peds; few distinct slickensides having polished and grooved surfaces; less than 2 percent, by volume, pebbles; slightly alkaline; gradual smooth boundary.

Bss2—16 to 29 inches; dark brown (7.5YR 3/2) clay; weak medium and coarse angular blocky structure; very hard, very firm, slightly sticky, very plastic; few fine roots; common fine and medium irregular pores; common prominent pressure faces on peds; few distinct slickensides having polished and grooved surfaces; less than 2 percent, by volume, pebbles; slightly alkaline; abrupt smooth boundary.

BC—29 to 32 inches; dark brown (7.5YR 3/2) sandy clay loam; massive; slightly hard, friable, slightly sticky, slightly plastic; few fine roots; common fine irregular pores; about 15 percent, by volume, parapebbles; slightly alkaline.

Cr—32 inches; moderately weathered, semiconsolidated, bedded volcanic rock.

Range in Characteristics

Thickness of the solum: 20 to 40 inches

Depth to bedrock: 20 to 40 inches

Content (by volume) and size of rock fragments: 0 to 20 percent pebbles in the A and Bss horizons and 10 to 40 percent parapebbles in the BC horizon

Reaction: Neutral or slightly alkaline throughout

A or Ap horizon:

Color—hue of 7.5YR or 10YR, value of 2 to 4, and chroma of 1 or 2

Texture—clay loam, clay, or their gravelly analogs

Bss horizon:

Color—hue of 5YR or 7.5YR, value of 3 or 4, and chroma of 2

Texture—clay or gravelly clay

Slickensides—few or common

Bssk horizon (where present):

Color—hue of 7.5YR, value of 3 or 4, and chroma of 1

Texture—clay or gravelly clay

Calcium carbonate—common or many masses

BC horizon:

Color—hue of 7.5YR, value of 3 or 4, and chroma of 1 or 2

Texture—sandy clay loam, clay loam, sandy clay, or their paragravelly analogs

Cr horizon:

Type of bedrock—moderately weathered, semiconsolidated, basic volcanic rock that can be excavated with difficulty using hand tools and is rippable by mechanical equipment

Montegrando Series

Depth class: Very deep

Drainage class: Somewhat poorly drained

Permeability: Moderately slow

Parent material: Stratified alluvial sediments over gravelly colluvium

Landscape: Uplands

Landform: Alluvial fans and low hills

Commonly associated soils: Coloso, Lares, Mabí, Múcara, and Toa soils

Slope: 2 to 12 percent

Taxonomic class: Very-fine, mixed, superactive, isohyperthermic Chromic Hapluderts

Typical Pedon

Montegrando clay, 2 to 12 percent slopes; about 3.2 miles northwest of downtown San Germán from the intersection of Puerto Rico Highways 102 and 347; about 0.7 mile west from the intersection of Puerto Rico Highways 317 and 102; about 200 feet south of Puerto Rico Highway 102, in a sugarcane field; San Germán Municipality; USGS San Germán topographic quadrangle (1966); lat. 18 degrees 5 minutes 18 seconds N. and long. 67 degrees 5 minutes 28 seconds W.

Ap—0 to 6 inches; dark yellowish brown (10YR 3/4) clay; weak medium subangular blocky structure; firm, slightly sticky, moderately plastic; many fine roots; few faint pressure faces on surfaces of peds; about 12 percent, by volume, pebbles; few fine black (10YR 2/1) manganese concretions; noneffervescent; strongly acid; clear smooth boundary.

AB—6 to 10 inches; dark grayish brown (10YR 4/2) clay; weak medium subangular blocky structure; firm, slightly sticky, moderately plastic; common fine roots; few faint pressure faces on surfaces of peds; about 10 percent, by volume, pebbles; common fine black (10YR 2/1) manganese concretions; noneffervescent; strongly acid; clear wavy boundary.

Bss1—10 to 14 inches; dark yellowish brown (10YR 3/4) clay; moderate medium angular blocky structure; firm, slightly sticky, moderately plastic; few fine roots; few distinct intersecting slickensides having polished and grooved surfaces; about 10 percent, by volume, pebbles; many fine black (10YR 2/1) manganese concretions; many fine distinct yellowish brown (10YR 5/6) masses of iron accumulation; many fine distinct gray (10YR 5/1) iron depletions; noneffervescent; strongly acid; clear smooth boundary.

Bss2—14 to 24 inches; yellowish brown (10YR 5/6) clay; weak medium angular blocky structure; firm, slightly sticky, moderately plastic; few fine roots; few distinct intersecting slickensides having polished and grooved surfaces; about 10 percent, by volume, pebbles; many fine black (10YR 2/1) manganese concretions; few fine calcium carbonate concretions; many medium distinct gray (10YR 5/1) iron depletions; strongly effervescent; moderately alkaline; clear smooth boundary.

C—24 to 32 inches; yellowish brown (10YR 5/6) gravelly clay; massive; firm, slightly sticky, slightly plastic; about 20 percent, by volume, pebbles; many fine black (10YR 2/1) manganese concretions; many medium distinct gray (10YR 6/1) and few fine distinct grayish brown (10YR 5/2) iron depletions; strongly effervescent; moderately alkaline; clear smooth boundary.

Cg—32 to 65 inches; gray (10YR 5/1) gravelly clay; massive; friable, slightly sticky, nonplastic; about 20 percent, by volume, pebbles; many fine black (10YR 2/1)

manganese concretions; few fine calcium carbonate concretions; common thin lenses and strata of interbedded material; many medium distinct yellowish brown (10YR 5/6) masses of iron accumulation; many medium prominent gray (5YR 5/1) iron depletions; strongly effervescent; moderately alkaline.

Range in Characteristics

Thickness of the solum: 20 to 36 inches

Content (by volume) and size of rock fragments: 0 to less than 15 percent pebbles in the A, AB, and Bss horizons and 20 to 75 percent pebbles in the C and Cg horizons

Reaction: Strongly acid to moderately alkaline in the Ap horizon and the upper part of the Bss horizon and neutral to moderately alkaline in the lower part of the Bss horizon and in the C and Cg horizons

A or Ap horizon:

Color—hue of 10YR, value of 3 or 4, and chroma of 2 to 4

Texture—clay

AB horizon (where present):

Color—hue of 10YR, value of 4, and chroma of 2 or 3

Texture—clay

Bss horizon:

Color—hue of 10YR, value of 3 or 4, and chroma of 3 to 6

Texture—clay

Bss horizon (lower part):

Color—hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 to 6

Texture—clay

C horizon:

Color—hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 6

Texture—clay or its gravelly to extremely gravelly analogs

Cg horizon:

Color—hue of 10YR, value of 4 or 5, and chroma of 1 or 2

Texture—clay or its gravelly to extremely gravelly analogs

Morado Series

Depth class: Moderately deep

Drainage class: Well drained

Permeability: Moderate

Parent material: Residuum that weathered from basalt flow and tuff

Landscape: Hills and mountains

Landform: Hillslopes and mountain slopes

Commonly associated soils: Caguabo, Consumo, Humatas, Múcara, and Quebrada soils

Slope: 12 to 60 percent

Taxonomic class: Fine, mixed, superactive, isohyperthermic Dystric Eutrudepts

Typical Pedon

Morado clay loam, 40 to 60 percent slopes; about 0.5 mile northwest from the intersection of Puerto Rico Highways 119 and 393; about 400 feet southwest of Puerto Rico Highway 393, in a coffee plantation; San Germán Municipality; USGS Rosario topographic quadrangle (1964); lat. 18 degrees 8 minutes 1 second N. and long. 67 degrees 2 minutes 59 seconds W.

- Ap—0 to 5 inches; very dark gray (5YR 3/1) clay loam; weak fine subangular blocky structure parting to moderate very fine and fine granular; slightly hard, friable, moderately sticky, very plastic; common fine roots; common fine interstitial pores; about 2 percent, by volume, parapebbles; slightly acid; clear smooth boundary.
- Bw—5 to 16 inches; very dark gray (5YR 3/1) clay; moderate fine subangular blocky structure; slightly hard, friable, moderately sticky, very plastic; few fine roots; common fine irregular and few fine tubular pores; about 2 percent, by volume, parapebbles; slightly acid; clear wavy boundary.
- BC—16 to 21 inches; dark brown (7.5YR 3/2) clay loam; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, very plastic; few fine roots; few fine irregular pores; about 12 percent, by volume, parapebbles; neutral; abrupt wavy boundary.
- Cr—21 to 31 inches; highly fractured, moderately weathered volcanic bedrock; accumulation of brown (7.5YR 4/3) clayey material between cracks; irregular wavy boundary.
- R—31 inches; fractured, unweathered volcanic bedrock.

Range in Characteristics

Thickness of the solum: 10 to 21 inches

Depth to bedrock: 20 to 29 inches

Content (by volume) and size of rock fragments: Less than 5 percent pebbles or parapebbles in the Ap horizon, 0 to 25 percent pebbles or parapebbles in the Bw horizon, and less than 15 percent parapebbles in the BC and C horizons

Reaction: Moderately acid to neutral throughout

A or Ap horizon:

Color—hue of 5YR or 7.5YR, value of 3 to 5, and chroma of 1 or 2

Texture—clay loam or clay

Bw horizon:

Color—hue of 5YR or 7.5YR, value of 3 to 6, and chroma of 1 or 2

Texture—clay loam, clay, or their gravelly or paragravelly analogs

BC horizon (where present):

Color—hue of 7.5YR, value of 3 or 4, and chroma of 1 or 2

Texture—clay loam

C horizon (where present):

Color—no dominant color; multicolored in shades of red, brown, yellow, and gray.

The low chroma colors are inherited from the parent material and are not due to wetness.

Texture—loam or silty clay loam. Original rock structure is visible, and weathered rock fragments can be easily broken between fingers.

Cr layer:

Type of bedrock—highly fractured, semiconsolidated, moderately weathered volcanic bedrock that can be dug with difficulty with hand tools and is rippable by mechanical equipment

R layer:

Type of bedrock—fractured, unweathered volcanic bedrock

Múcara Series

Depth class: Moderately deep

Drainage class: Well drained

Permeability: Moderate

Parent material: Residuum that weathered from basalt lava and breccia

Landscape: Hills and mountains

Landform: Hillslopes and mountain slopes

Commonly associated soils: Cabo Rojo, Caguabo, Consumo, Humatas, La Tea, Malaya, Montegrande, Morado, and Quebrada soils

Slope: 5 to 60 percent

Taxonomic class: Coarse-loamy, vermiculitic, isohyperthermic Dystric Eutrudepts

Typical Pedon

Múcara loam, 20 to 40 percent slopes; about 2.2 miles southwest of the city of Cabo Rojo from the intersection of Puerto Rico Highways 102 and 312; about 1.2 miles southwest from the intersection of Puerto Rico Highways 308 and 307; about 2,200 feet southeast of Puerto Rico Highway 307 on a paved road; about 20 feet northeast of the paved road, in naturalized pastureland; Cabo Rojo Municipality; USGS Puerto Real topographic quadrangle (1966); lat. 18 degrees 4 minutes 2 seconds N. and long. 67 degrees 10 minutes 11 seconds W.

Ap—0 to 5 inches; dark olive brown (2.5Y 3/3) loam; weak fine granular structure; soft, friable, slightly sticky, moderately plastic; many fine roots; common fine irregular and few fine tubular pores; about 4 percent, by volume, pebbles; very slightly effervescent; slightly alkaline; clear wavy boundary.

Bw1—5 to 12 inches; olive brown (2.5Y 4/3) loam; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, moderately plastic; few faint pressure faces on peds; common fine roots; common very fine and fine irregular pores; about 5 percent, by volume, pebbles; very slightly effervescent; slightly alkaline; clear wavy boundary.

Bw2—12 to 18 inches; olive brown (2.5Y 4/3) fine sandy loam; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, moderately plastic; few fine roots; common very fine and fine irregular pores; about 2 percent, by volume, pebbles; about 20 percent, by volume, saprolite-like material; noneffervescent; slightly alkaline; abrupt wavy boundary.

C—18 to 32 inches; 40 percent olive brown (2.5Y 4/3), 30 percent light brownish gray (2.5Y 6/2), and 30 percent light yellowish brown (2.5Y 6/4) gravelly sandy loam in a variegated pattern having crushed color of olive (5Y 4/3); massive; soft, friable, slightly sticky, slightly plastic; about 20 percent, by volume, pebbles; few fine roots; noneffervescent; neutral.

Cr—32 inches; slightly weathered, fractured volcanic bedrock.

Range in Characteristics

Thickness of the solum: 10 to 20 inches

Depth to bedrock: 20 to 40 inches

Content (by volume) and size of rock fragments: 0 to 15 percent pebbles in the Ap and Bw horizons and less than 25 percent pebbles in the C horizon

Reaction: Slightly alkaline to strongly acid throughout

A or Ap horizon:

Color—hue of 5YR to 2.5Y, value of 2 to 5, and chroma of 2 to 4

Texture—loam, silty clay loam, silty clay, clay loam, or clay

Bw horizon:

Color—hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 6

Texture—fine sandy loam, loam, silty clay loam, clay loam, silty clay, or clay

BC horizon (where present):

Color—hue of 7.5YR to 2.5Y, value of 3 to 6, and chroma of 2 to 6

Texture—sandy loam, loam, silty clay loam, clay loam, silty clay, or clay

C horizon:

Color—no dominant color; multicolored in shades of brown, yellow, and gray. The low chroma colors are inherited from the parent material and are not due to wetness.

Texture—sandy loam, loam, silty clay loam, or their gravelly analogs. The original rock structure is visible, and weathered rock fragments can be easily broken between fingers.

Cr layer:

Type of bedrock—semiconsolidated, slightly weathered volcanic rock that can be excavated with difficulty using hand tools and is rippable by mechanical equipment

Nipe Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderate

Parent material: Iron-rich residuum that weathered from serpentinite bedrock

Landscape: Hills and mountains

Landform: Ridges

Commonly associated soils: Delicias, El Cacique, La Taína, Maresúa, Rosario, Santa Marta, and Voladora soils

Slope: 2 to 20 percent

Taxonomic class: Very-fine, ferruginous, isohyperthermic Typic Acrudox

Typical Pedon

Nipe clay, 5 to 20 percent slopes; in Maricao State Forest; about 1.3 miles southwest of the intersection of Puerto Rico Highways 120 and 362; about 1.0 mile southwest of Campamento Santana on a forest trail; about 50 feet northwest of the trail, in forestland; San Germán, Municipality; USGS Maricao topographic quadrangle (1960); lat. 18 degrees 7 minutes 41 seconds N. and long. 66 degrees 58 minutes 30 seconds W.

Oi—0 to 2 inches; undecomposed plant material; abrupt smooth boundary.

Ap—2 to 7 inches; dusky red (10R 3/3) clay; strong fine granular structure; hard, firm, slightly sticky, slightly plastic; common fine and few medium and coarse roots; few fine irregular and common fine vesicular pores; about 3 percent, by volume, iron-manganese concretions; strongly acid; clear smooth boundary.

A—7 to 11 inches; dusky red (10R 3/3) clay; strong fine granular structure; hard, firm, slightly sticky, slightly plastic; common fine roots; few fine irregular pores; about 6 percent, by volume, iron-manganese concretions; moderately acid; clear smooth boundary.

Bo1—11 to 22 inches; dusky red (10R 3/4) clay; moderate medium subangular blocky structure; slightly hard, firm, slightly sticky, slightly plastic; few faint clay films on faces of peds; few fine roots; few fine tubular and irregular pores; about 2 percent, by volume, iron-manganese concretions; moderately acid; clear smooth boundary.

Bo2—22 to 31 inches; dusky red (10R 3/4) clay; weak medium subangular blocky structure; slightly hard, firm, slightly sticky, plastic; few distinct clay films on faces of peds; few fine roots; few fine irregular pores; about 1 percent, by volume, iron-manganese concretions; moderately acid; gradual smooth boundary.

Bo3—31 to 43 inches; dusky red (10R 3/4) clay; weak medium subangular blocky structure; soft, friable, slightly sticky, slightly plastic; few distinct clay films on faces of peds; few fine roots; few fine irregular pores; moderately acid; clear smooth boundary.

Bo4—43 to 80 inches; dusky red (10R 3/4) clay; weak medium subangular blocky structure; slightly hard, firm, slightly sticky, slightly plastic; common prominent clay films on faces of peds; few fine roots; few fine irregular pores; strongly acid.

Range in Characteristics

Thickness of the solum: More than 80 inches

Content of iron-manganese concretions: Less than 15 percent, by volume

Reaction: Strongly acid or moderately acid throughout

Oi horizon (where present):

Texture—undecomposed material, such as bark, branches, leaves, and twigs

A and Ap horizons:

Color—hue of 10R or 2.5YR, value of 2 or 3, and chroma of 2 to 6

Texture—clay

Bo horizon:

Color—hue of 7.5R to 2.5YR, value of 3 or 4, and chroma of 4 to 6

Texture—clay

Olivares Series

Depth class: Very deep

Drainage class: Very poorly drained

Permeability: Slow

Parent material: Loamy and clayey, alluvial and marine sediments

Landscape: Coastal plains

Landform: Alluvial flats and depressions

Commonly associated soils: Cartagena, Fraternidad, and Teresa soils

Slope: 0 to 1 percent

Taxonomic class: Fine, mixed, superactive, nonacid, isohyperthermic Typic Endoaquents

Typical Pedon

Olivares muck, ponded; in Cartagena Lagoon National Wildlife Refuge; about 1.2 miles south-southeast of Llanos Ward and about 1,000 feet east of a water cut-off valve; Lajas Municipality; USGS San Germán topographic quadrangle (1966); lat. 18 degrees 0 minutes 54 seconds N. and long. 67 degrees 6 minutes 25 seconds W.

Oa—0 to 2 inches; black (10YR 2/1) muck; about 60 percent fiber, by volume, unrubbed and 15 percent rubbed; weak fine granular structure; very friable; many fine and medium roots; moderately alkaline; clear wavy boundary.

Cg1—2 to 25 inches; dark brown (10YR 3/3) silty clay; massive; firm, very sticky, very plastic; many fine roots; few distinct strong brown (7.5YR 4/6) masses of iron accumulation; moderately alkaline; clear wavy boundary.

Cg2—25 to 48 inches; very dark gray (5Y 3/1) silty clay; massive; firm, very sticky, very plastic; few fine distinct dark yellowish brown (10YR 3/6) masses of iron accumulation; moderately alkaline; gradual wavy boundary.

Cg3—48 to 80 inches; black (5Y 2.5/1) silty clay; massive; firm, very sticky, very plastic; moderately alkaline.

Range in Characteristics

Thickness of the solum: 2 to 4 inches

Content (by volume) and size of rock fragments: Less than 2 percent pebbles throughout

Reaction: Slightly alkaline or moderately alkaline in the Oa horizon and in the A horizon, where present, and moderately alkaline in the C horizon

Oa horizon (where present):

Color—hue of 10YR, value of 2 or 3, and chroma of 1 or 2

Texture—muck

A horizon (where present):

Color—hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2

Texture—loam, silty clay loam, or silty clay

Cg horizon:

Color—hue of 10YR to 5Y, value of 2.5 to 5, and chroma of 1 to 6; or no dominant color in the upper part and multicolored in shades of gray, brown, and yellow

Redoximorphic features—few to many masses of iron accumulation in shades of brown and yellow

Palmarejo Series

Depth class: Very deep

Drainage class: Moderately well drained

Permeability: Moderate

Parent material: Sediments that weathered from volcanic bedrock

Landscape: Coastal plains

Landform: Alluvial fans

Commonly associated soils: Fraternidad, Jácana, and Mariana soils

Slope: 0 to 12 percent

Taxonomic class: Fine, mixed, semiactive, isohyperthermic Typic Haplustults

Typical Pedon

Palmarejo loam, 0 to 2 percent slopes; about 0.7 mile northeast of the intersection of Puerto Rico Highways 306 and 101; about 0.35 mile south of Puerto Rico Highways 306 and 394; about 200 feet west of a dirt road; Lajas Municipality; USGS San Germán topographic quadrangle (1966); lat. 18 degrees 2 minutes 12 seconds N. and long. 67 degrees 6 minutes 1 second W.

Ap—0 to 9 inches; dark brown (7.5YR 3/2) loam; weak fine granular structure; friable, moderately sticky, slightly plastic; many fine roots; about 5 percent, by volume, pebbles; very strongly acid; abrupt smooth boundary.

Bt1—9 to 18 inches; 50 percent yellowish brown (10YR 5/6) and 50 percent dark brown (7.5YR 3/2) clay; moderate medium subangular blocky structure; firm, slightly sticky, moderately plastic; common fine roots; few faint clay films on faces of peds; about 5 percent, by volume, pebbles; very strongly acid; clear smooth boundary.

Bt2—18 to 30 inches; yellowish brown (10YR 5/8) clay; moderate medium subangular blocky structure; firm, slightly sticky, moderately plastic; few fine roots; few faint clay films on faces of peds; about 5 percent, by volume, pebbles; many coarse distinct dark yellowish brown (10YR 4/6) masses of iron accumulation; very strongly acid; clear smooth boundary.

BC—30 to 41 inches; 50 percent yellowish brown (10YR 5/8) and 50 percent white (7.5YR 8/1) clay loam; massive; firm, sticky, moderately plastic; few fine roots; about 3 percent, by volume, pebbles; few black (10YR 2/1) manganese concretions; the areas in shades of yellow and brown are masses of iron accumulation; the areas in shades of white are iron depletions; very strongly acid; clear smooth boundary.

C—41 to 60 inches; 50 percent red (2.5YR 4/8) and 50 percent white (7.5YR 8/1) sandy clay loam in a variegated pattern; massive; firm, slightly sticky, moderately plastic; about 5 percent, by volume, pebbles; few black (10YR 2/1) manganese

concretions; the areas in shades of red are masses of iron accumulation and the areas in shades of white are iron depletions; very strongly acid.

Range in Characteristics

Thickness of the solum: 30 to more than 60 inches

Content (by volume) and size of rock fragments: Less than 15 percent pebbles throughout

Reaction: Extremely acid or very strongly acid throughout

A or Ap horizon:

Color—hue of 7.5YR or 10YR, value of 2 to 4, and chroma of 2 to 4

Texture—loam or clay loam

Bt horizon:

Color—hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 2 to 8

Texture—silty clay loam, clay loam, silty clay, or clay

Redoximorphic features—none to common masses of iron accumulation in shades of brown or yellow in the lower part

BC horizon:

Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8; or no dominant color and multicolored in shades red, brown, yellow, and gray

Texture—sandy clay loam or clay loam

C horizon:

Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 4 to 8; or no dominant color and multicolored in shades red, brown, yellow, and gray

Texture—sandy clay loam or clay loam

Parguera Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Slow

Parent material: Clayey and loamy alluvial sediments that weathered from limestone bedrock

Landscape: Uplands

Landform: Alluvial fans and terraces

Commonly associated soils: Altamira, Guayacán, Melones, and Montalva soils

Slope: 0 to 5 percent

Taxonomic class: Clayey-skeletal, carbonatic, isohyperthermic Typic Calciargids

Typical Pedon

Parguera clay, 0 to 2 percent slopes; about 1.9 miles west of the intersection of Puerto Rico Highways 304 and 324; about 1.5 miles west of the community of La Parguera; about 20 feet east of a dirt road, in a hayfield; Lajas Municipality; USGS Parguera topographic quadrangle (1966); lat. 17 degrees 58 minutes 42 seconds N. and long. 67 degrees 4 minutes 17 seconds W.

Ap—0 to 7 inches; dark brown (10YR 3/3) clay; strong medium granular structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine and common medium roots; many very fine and common fine interstitial pores; about 2 percent, by volume, pebbles; strongly effervescent; slightly alkaline; clear wavy boundary.

Bt—7 to 22 inches; dark yellowish brown (10YR 3/4) clay; strong medium angular blocky structure; slightly hard, firm, moderately sticky, moderately plastic; common

fine and medium roots; about 2 percent, by volume, pebbles; strongly effervescent; moderately alkaline; abrupt wavy boundary.

2Btk—22 to 39 inches; dark yellowish brown (10YR 4/6) extremely gravelly clay; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine, fine, and medium roots; many very fine and fine tubular and vesicular pores; common filaments of calcium carbonate; about 80 percent, by volume, pebbles; prominent secondary coatings of calcium carbonate on pebbles; violently effervescent; moderately alkaline; clear wavy boundary.

2BCk—39 to 57 inches; dark yellowish brown (10YR 4/6) extremely gravelly coarse sandy loam; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine to medium roots; many very fine, fine, and medium tubular and vesicular pores; few distinct pink (7.5YR 8/4) soft masses and filaments of calcium carbonate; about 75 percent, by volume, pebbles and 1 percent cobbles; prominent secondary coating of calcium carbonate on pebbles and cobbles; violently effervescent; strongly alkaline; abrupt smooth boundary.

3C1—57 to 71 inches; strong brown (7.5YR 4/6) clay; massive; slightly hard, firm, moderately sticky, moderately plastic; few fine roots; common very fine tubular and vesicular pores; many prominent pink (7.5YR 8/4) soft masses of calcium carbonate; about 2 percent, by volume, pebbles; strongly effervescent; moderately alkaline; clear wavy boundary.

3C2—71 to 80 inches; strong brown (7.5YR 4/6) clay; massive; slightly hard, firm, moderately sticky, moderately plastic; few very fine roots; common very fine and fine tubular and vesicular pores; few prominent pink (7.5YR 8/4) soft masses of calcium carbonate; about 2 percent, by volume, pebbles; strongly effervescent; moderately alkaline.

Range in Characteristics

Thickness of the solum: 40 to 60 inches

Content (by volume) and size of rock fragments: Less than 5 percent in the Ap and Bt horizons, mostly pebbles; 15 to 80 percent in the Btk horizon, mostly pebbles; 35 to 80 percent in the BC horizon, mostly pebbles; less than 5 percent in the C, 2C, and 3C horizons, mostly pebbles

Reaction: Slightly alkaline or moderately alkaline throughout

A or Ap horizon:

Color—hue of 5YR to 10YR, value of 3 or 4, and chroma of 2 to 4

Texture—clay loam or clay

Bt horizon:

Color—hue of 2.5YR to 10YR, value of 3 or 4, and chroma of 2 to 6

Texture—clay loam or clay

Btk horizon:

Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 6

Texture in the fine-earth fraction—clay loam or clay

Calcium carbonate—common or many filaments and soft masses

BCk horizon (where present):

Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 2 to 6

Texture in the fine-earth fraction—coarse sandy clay loam, sandy loam, or sandy clay loam

C horizon:

Color—hue of 5YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8

Texture—clay loam or clay

Calcium carbonate—few to many soft masses

Pitahaya Series

Depth class: Shallow

Drainage class: Well drained

Permeability: Very slow

Parent material: Residuum and colluvium that weathered from limestone bedrock

Landscape: Hills

Landform: Ridges and hillslopes

Commonly associated soils: Altamira, Casabe, Costa, El Papayo, Guayacán, La Covana, Montalva, and Seboruco soils

Slope: 5 to 90 percent

Taxonomic class: Clayey-skeletal, mixed, superactive, nonacid, isohyperthermic, shallow Typic Torriorthents

Typical Pedon

Pitahaya gravelly clay in an area of Costa-Pitahaya complex, 5 to 20 percent slopes; about 3.0 miles west of the community of La Parguera; about 1.7 miles southeast of Rancho Cabassa; about 20 feet east of a gravel road, in naturalized pastureland; Lajas Municipality; USGS Parguera topographic quadrangle (1966); lat. 17 degrees 58 minutes 56 seconds N. and long. 67 degrees 5 minutes 32 seconds W.

Ap—0 to 2 inches; dark brown (10YR 3/3) gravelly clay; strong medium granular structure; slightly hard, firm, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and common fine interstitial pores; about 15 percent, by volume, pebbles and 2 percent cobbles; strongly effervescent; moderately alkaline; clear wavy boundary.

AC—2 to 11 inches; brown (10YR 4/3) extremely gravelly clay; massive; slightly hard, firm, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and common fine tubular and vesicular pores; about 70 percent, by volume, pebbles; strongly effervescent; moderately alkaline; abrupt wavy boundary.

Cr1—11 to 21 inches; very pale brown (10YR 7/4), hard, semiconsolidated, fractured limestone; strong medium and thick platy rock structure; many very fine and common fine and medium roots in fracture planes; violently effervescent; moderately alkaline; clear wavy boundary.

Cr2—21 to 27 inches; very pale brown (10YR 7/4), hard, semiconsolidated, fractured limestone; strong medium and thick platy rock structure; few very fine roots in fracture planes; violently effervescent; moderately alkaline; abrupt wavy boundary.

R—27 to 80 inches; very pale brown (10YR 7/4), hard, consolidated limestone bedrock; violently effervescent; moderately alkaline.

Range in Characteristics

Thickness of the solum: 5 to 20 inches

Depth to bedrock: 5 to 20 inches to hard, semiconsolidated limestone and 20 to 30 inches to hard, unweathered limestone bedrock

Content (by volume) and size of rock fragments: 5 to 60 percent pebbles and cobbles in the A or Ap horizon; 35 to 80 percent pebbles and cobbles in the AC horizon; and 25 to 50 percent pebbles and cobbles in the C horizon, where present

Reaction: Moderately alkaline throughout

A or Ap horizon:

Color—hue of 10YR, value of 3 to 5, and chroma of 2 to 4

Texture—clay loam, clay, or their gravelly or very gravelly analogs

AC horizon:

Color—hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 3 or 4

Texture—clay loam, clay, or their very gravelly to extremely gravelly analogs

C horizon (where present):

Color—hue of 7.5YR or 10YR, value of 6 to 8, and chroma of 2 to 4

Texture—loam, silt loam, or their gravelly analogs

Cr layer:

Color—hue of 7.5YR to 2.5Y, value of 6 to 8, and chroma of 2 to 6

Type of bedrock—hard, semiconsolidated, fractured limestone that can be excavated with difficulty using hand tools and is rippable by mechanical equipment

R layer:

Type of bedrock—hard, consolidated limestone bedrock

Pozo Blanco Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderately slow

Parent material: Alluvium and colluvium over residuum that was derived from soft limestone

Landscape: Uplands

Landform: Alluvial fans and low hills

Commonly associated soils: Aguilita, Coamo, Descalabrado, Duey, Fraternidad, Jácana, and San Germán soils

Slope: 0 to 20 percent

Taxonomic class: Fine-loamy, mixed, superactive, isohyperthermic Aridic Calciustolls

Typical Pedon

Pozo Blanco clay, 0 to 5 percent slopes; about 1.1 miles east from the intersection of Puerto Rico Highways 2 and 332; about 800 meters northwest from the intersection of Puerto Rico Highways 2 and 116; about 400 feet northeast of a dirt road, in idle land; Guánica Municipality; USGS Sabana Grande topographic quadrangle (1966); lat. 18 degrees 1 minute 1 second N. and long. 66 degrees 53 minutes 30 seconds W.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) clay; weak fine and medium subangular blocky structure; very hard, very firm, slightly sticky, very plastic; common fine roots; many very fine and fine irregular pores; about 12 percent, by volume, pebbles; few very fine masses of calcium carbonate concentrations; violently effervescent; moderately alkaline; clear smooth boundary.

Bw1—7 to 15 inches; very dark grayish brown (10YR 3/2) clay; strong fine and medium subangular blocky structure; very hard, very firm, slightly sticky, very plastic; common fine roots; common very fine and fine irregular and few very fine tubular pores; less than 5 percent, by volume, pebbles; few very fine soft masses of calcium carbonate concentrations; violently effervescent; moderately alkaline; clear smooth boundary.

Bw2—15 to 22 inches; dark brown (7.5YR 3/3) clay; strong fine and medium subangular blocky structure; hard, firm, slightly sticky, very plastic; few fine roots; common very fine and fine irregular and few very fine tubular pores; less than 5 percent, by volume, pebbles; few very fine and fine soft masses of calcium carbonate concentrations; violently effervescent; moderately alkaline; clear wavy boundary.

Bk—22 to 30 inches; brown (7.5YR 4/3) gravelly clay loam; moderate fine subangular blocky structure; hard, firm, slightly sticky, moderately plastic; few fine roots; common very fine and fine irregular and few very fine tubular pores; about 25 percent, by volume, pebbles; common very fine and fine distinct very pale brown

(10YR 7/3) soft masses of calcium carbonate; violently effervescent; moderately alkaline; gradual wavy boundary.

C1—30 to 40 inches; dark yellowish brown (10YR 4/4) gravelly loam; massive; slightly hard, friable, slightly sticky, slightly plastic; few fine roots; common very fine irregular and few very fine tubular pores; common fine faint very pale brown (10YR 7/3) concretions of calcium carbonate; about 20 percent, by volume, limestone pebbles; violently effervescent; moderately alkaline; abrupt wavy boundary.

C2—40 to 60 inches; yellowish brown (10YR 5/4) loam; massive; soft, friable, slightly sticky, slightly plastic; few fine roots; common very fine irregular and few very fine tubular pores; common fine faint very pale brown (10YR 7/3) concretions of calcium carbonate; about 10 percent, by volume, limestone pebbles; violently effervescent; moderately alkaline.

Range in Characteristics

Thickness of the solum: 24 to 42 inches

Content (by volume) and size of rock fragments: Less than 15 percent pebbles in the Ap horizon, 5 to 20 percent pebbles in the Bw horizon, 2 to 25 percent pebbles in the Bk horizon, and 5 to 50 percent pebbles in the C horizon

Reaction: Slightly alkaline or moderately alkaline throughout

Ap horizon:

Color—hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 1 or 2

Texture—clay

Bw horizon:

Color—hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4

Texture—clay loam, clay, or their gravelly analogs

Bk horizon:

Color—hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 3 to 6

Texture—clay loam, silty clay loam, clay, or their gravelly analogs

C horizon:

Color—hue of 10YR, value of 4 to 6, and chroma of 3 to 6

Texture—sandy loam, loam, silty clay loam, or their gravelly or very gravelly analogs

Quebrada Series

Depth class: Shallow

Drainage class: Well drained

Permeability: Moderate

Parent material: Colluvium and residuum weathered from tuffaceous sandstone, siltstone, breccia, conglomerate, lava, and tuff

Landscape: Mountain ranges

Landform: Mountain slopes

Commonly associated soils: Caguabo, Consumo, El Cacique, Humatas, La Taína, Morado, and Múcara soils

Slope: 12 to 60 percent

Taxonomic class: Clayey, mixed, active, isohyperthermic, shallow Typic Hapludalfs

Typical Pedon

Quebrada clay loam, 40 to 60 percent slopes; about 3.0 miles northeast of downtown Sabana Grande from the intersection of Puerto Rico Highways 120 and 364; about 0.6 mile southwest of Fraile Peak; about 0.4 mile west of Puerto Rico Highway 365 on a dirt road; about 50 feet north of the road, in naturalized pastureland; Sabana Grande

Municipality; USGS Sabana Grande topographic quadrangle (1966); lat. 18 degrees 6 minutes 48 seconds N. and long. 66 degrees 55 minutes 43 seconds W.

Ap—0 to 2 inches; very dark gray (10YR 3/1) clay loam; strong fine and medium granular structure; soft, friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine irregular pores; about 5 percent, by volume, pebbles; slightly acid; clear smooth boundary.

Bt1—2 to 10 inches; brown (10YR 4/3) clay; strong medium subangular blocky structure; slightly hard, firm, slightly sticky, slightly plastic; common distinct clay films on faces of peds; many very fine and fine roots; common fine irregular pores; about 5 percent, by volume, pebbles; neutral; clear wavy boundary.

Bt2—10 to 19 inches; dark grayish brown (10YR 4/2) clay; strong medium and coarse subangular blocky structure; slightly hard, firm, slightly sticky, slightly plastic; common prominent clay films on faces of peds; common fine and medium roots; common fine and medium irregular and few fine tubular pores; about 10 percent, by volume, pebbles; neutral; abrupt wavy boundary.

Cr1—19 to 26 inches; highly weathered volcanic rock; few fine roots; neutral; abrupt wavy boundary.

Cr2—26 to 60 inches; highly fractured volcanic rock; neutral.

Range in Characteristics

Thickness of the solum: 9 to 20 inches

Depth to bedrock: 9 to 20 inches to highly fractured, unconsolidated rock

Content (by volume) and size of rock fragments: 2 to 10 percent pebbles and 0 to 5 percent cobbles in the Ap horizon; 0 to 2 percent pebbles in the AB horizon, where present; and 0 to 10 percent pebbles in the Bt horizon

Reaction: Slightly acid or neutral throughout

A or Ap horizon:

Color—hue of 10YR, value of 3 or 4, and chroma of 1 or 3

Texture—sandy loam, silty clay loam, clay loam, or clay

AB horizon (where present):

Color—hue of 10YR, value of 3, and chroma of 3

Texture—sandy clay loam

Bt horizon:

Color—hue of 10YR, value of 3 or 4, and chroma of 2 to 4

Texture—clay loam, silty clay, or clay

Cr layer (upper part):

Type of bedrock—highly weathered volcanic rock that can be easily excavated with hand tools

Cr layer (lower part):

Type of bedrock—highly fractured volcanic rock that can be excavated with difficulty using hand tools and is rippable by mechanical equipment

Reilly Series

Depth class: Very deep

Drainage class: Excessively drained

Permeability: Rapid

Parent material: Stratified alluvial deposits of mixed origin

Landscape: River valleys

Landform: Flood plains

Commonly associated soils: Bajura, Coloso, Dique, Lares, and Toa soils

Slope: 0 to 2 percent

Taxonomic class: Sandy-skeletal, mixed, isohyperthermic Mollic Udifluvents

Typical Pedon

Reilly sandy loam, 0 to 2 percent slopes, frequently flooded (fig. 30); about 1.95 miles southwest of downtown Sabana Grande; about 0.5 mile southeast of the community of Minillas; about 0.5 mile northeast from Puerto Rico Highway 329 on a gravel road; San Germán Municipality; USGS Sabana Grande topographic quadrangle (1966); lat. 18 degrees 4 minutes 19 seconds N. and long. 66 degrees 59 minutes 16 seconds W.



Figure 30.—Profile of Reilly sandy loam, 0 to 2 percent slopes, frequently flooded. Reilly soils are characterized by a surface layer of sandy loam and stratified subsurface layers of sand, gravels, and cobbles.

- Ap—0 to 4 inches; dark olive brown (2.5Y 3/3) sandy loam; weak fine and medium granular structure; soft, friable, nonsticky, slightly plastic; many fine interstitial pores; many fine and common medium roots; less than 2 percent, by volume, pebbles; neutral; clear smooth boundary.
- C1—4 to 8 inches; dark olive brown (2.5Y 3/3) loamy sand; single grained; loose, loose, nonsticky, nonplastic; common fine and few medium roots; common fine and few medium interstitial pores; less than 5 percent, by volume, pebbles; neutral; clear smooth boundary.
- C2—8 to 11 inches; dark olive brown (2.5Y 3/3) fine sandy loam; massive; soft, friable, nonsticky, nonplastic; common fine and few medium roots; common fine and few medium interstitial pores; common fine yellowish brown (10YR 5/8) masses of iron accumulation; neutral; abrupt smooth boundary.
- C3—11 to 17 inches; dark grayish brown (2.5Y 4/2) fine sandy loam; massive; soft, friable, nonsticky, slightly plastic; common fine roots; common fine interstitial pores; few fine and medium reddish brown (5YR 4/4) masses of iron accumulation; neutral; abrupt wavy boundary.
- 2C—17 to 23 inches; dark olive brown (2.5Y 3/3) extremely gravelly coarse sand; single grained; loose, loose, nonsticky, nonplastic; common very fine and fine roots; many fine interstitial pores; about 60 percent, by volume, pebbles; neutral; abrupt smooth boundary.
- 3C—23 to 32 inches; very dark grayish brown (2.5Y 3/2) sand; single grained; loose, loose, nonsticky, nonplastic; many fine roots; many very fine and fine and few medium interstitial pores; about 5 percent, by volume, pebbles; neutral; clear smooth boundary.
- 4C—32 to 36 inches; very dark grayish brown (2.5Y 3/2) loam; massive; soft, very friable, nonsticky, slightly plastic; common fine roots; few very fine and fine interstitial pores; common fine yellowish brown (10YR 5/6) masses of iron accumulation; neutral; abrupt smooth boundary.
- 5C—36 to 80 inches; very dark grayish brown (2.5Y 3/2) extremely gravelly sand; single grained; loose, loose, nonsticky, nonplastic; common fine and medium interstitial pores; about 65 percent, by volume, pebbles and 20 percent cobbles; neutral.

Range in Characteristics

Thickness of the solum: 3 to 15 inches

Content (by volume) and size of rock fragments: 2 to 20 percent pebbles in the A and AC horizons, 5 to 35 percent pebbles and cobbles in the upper part of the C horizon, and 5 to 85 percent pebbles and cobbles in the lower part of the C horizon

Reaction: Neutral to moderately alkaline throughout

A or Ap horizon:

Color—hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 2 to 4

Texture in the fine-earth fraction—sandy loam, fine sandy loam, loam, or silt loam

AC horizon (where present):

Color—hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 3 or 4

Texture in the fine-earth fraction—sandy loam or loam

Redoximorphic features—none to common masses of iron accumulation in shades of brown

C horizon:

Color—hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 2 to 3

Texture in the fine-earth fraction—coarse sand, sand, loamy sand, or fine sandy loam

Redoximorphic features—none to many masses of iron accumulation in shades of brown

Rosario Series

Depth class: Shallow

Drainage class: Well drained

Permeability: Moderate

Parent material: Iron-rich residuum that weathered from serpentinite bedrock

Landscape: Hills and mountains

Landform: Ridges, hillslopes, and mountain slopes

Commonly associated soils: Delicias, El Cacique, La Taína, Maresúa, Nipe, and Santa Marta soils

Slope: 12 to 60 percent

Taxonomic class: Clayey, ferruginous, isohyperthermic, shallow Inceptic Hapludox

Typical Pedon

Rosario silty clay, 40 to 60 percent slopes; in Maricao State Forest; about 1.4 miles southwest of the intersection of Puerto Rico Highways 120 and 362; about 1.4 miles southwest of Campamento Santana on a forest trail; about 50 feet northwest of the trail, in forestland; San Germán Municipality; USGS Maricao topographic quadrangle (1960); lat. 18 degrees 7 minutes 38 seconds N. and long. 66 degrees 58 minutes 34 seconds W.

Oi—0 to 2 inches; leaves, needles, twigs, sticks, and bark with 25 percent intermediate decomposition of organic material; abrupt smooth boundary.

Ap—2 to 6 inches; dark yellowish brown (10YR 3/4) silty clay; strong fine and medium granular structure; hard, firm, slightly sticky, plastic; common very fine and few fine roots; many fine and medium irregular pores; about 7 percent, by volume, iron-manganese concretions; moderately acid; clear wavy boundary.

Bo1—6 to 11 inches; dusky red (10R 3/4) silty clay; strong fine and medium granular structure; soft, friable, slightly sticky, plastic; few faint clay films on faces of peds; few fine roots; common fine and medium irregular pores; about 7 percent, by volume, iron-manganese concretions; slightly acid; clear wavy boundary.

Bo2—11 to 16 inches; dusky red (10R 3/3) silty clay; moderate fine and medium subangular blocky structure; soft, friable, slightly sticky, plastic; few distinct clay films on faces of peds; few fine roots; common fine irregular pores; about 5 percent, by volume, iron-manganese concretions; slightly acid; clear irregular boundary.

Bo3—16 to 32 inches; dusky red (10R 3/3) silty clay loam; weak fine and medium subangular blocky structure; slightly hard, firm, slightly sticky, plastic; few faint clay films on faces of peds; few fine and medium roots; common fine irregular pores; about 7 percent, by volume, iron-manganese concretions; neutral; abrupt wavy boundary.

Cr—32 to 44 inches; highly fractured, weathered serpentinite bedrock.

R—44 inches; hard, consolidated serpentinite bedrock.

Range in Characteristics

Thickness of the solum: 15 to 45 inches

Depth to bedrock: 20 to 45 inches

Content of iron concretions: Less than 15 percent, by volume

Reaction: Strongly acid to slightly acid in the A horizon and the upper part of the Bo horizon and slightly acid or neutral in the lower part of the Bo horizon

Oi horizon (where present):

Texture—intermediately decomposed material, such as bark, branches, leaves, and twigs

A or Ap horizon:

Color—hue of 10R to 10YR, value of 2 or 3, and chroma of 2 to 4

Texture—clay loam, silty clay, or clay

Bo horizon (upper part):

Color—hue of 10R or 2.5YR, value of 3 or 4, and chroma of 3 or 4

Texture—clay loam, silty clay, or clay

Bo horizon (lower part):

Color—hue of 10R or 2.5YR, value of 3 or 4, and chroma of 3 or 4

Texture—clay loam or silty clay loam

BC horizon (where present):

Color—hue of 5YR, value of 4, and chroma of 4

Texture—clay loam

C horizon (where present):

Color—hue of 5YR to 10YR, value of 4 or 5, and chroma of 4 to 6

Texture—clay loam

Cr horizon:

Type of paralithic contact—very weakly cemented to moderately cemented, highly fractured, weathered serpentinite that can be excavated with difficulty using hand tools and is rippable by mechanical equipment

R layer:

Type of bedrock—hard, consolidated serpentinite bedrock

Rubias Series

Depth class: Moderately deep

Drainage class: Well drained

Permeability: Moderate

Parent material: Residuum that weathered from mudstone

Landscape: Mountain ranges

Landform: Ridges and mountain slopes

Commonly associated soils: Agüeybaná, Chiquito, Cuchillas, and Maricao soils

Slope: 40 to 90 percent

Taxonomic class: Fine, mixed, active, isothermic Humic Eutrudepts

Typical Pedon

Rubias clay loam (fig. 31) in an area of Rubias-Chiquito complex, 60 to 90 percent slopes; about 4.0 miles southwest of the community of Castañer from the intersection of Puerto Rico Highways 135 and 374; about 0.3 mile southwest of Hacienda Las Piñas homestead, in a coffee plantation; Yauco Municipality; USGS Monte Guilarte topographic quadrangle (1960); lat. 18 degrees 8 minutes 1 second N. and long. 66 degrees 52 minutes 10 seconds W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) clay loam; strong very fine and fine granular structure; hard, firm, slightly sticky, moderately plastic; common very fine and fine roots; many very fine and fine interstitial pores; few faint pressure faces on peds; about 5 percent, by volume, pebbles; neutral; clear wavy boundary.

Bw1—8 to 13 inches; very dark grayish brown (10YR 3/2) clay loam; strong very fine and fine subangular blocky structure; hard, firm, slightly sticky, moderately plastic; common very fine and fine roots; common very fine and fine irregular pores; common distinct pressure faces on peds; about 5 percent, by volume, pebbles; neutral; clear wavy boundary.



Figure 31.—Profile of a Rubias soil in an area of Rubias-Chiquito complex, 60 to 90 percent slopes. Rubias soils are characterized by surface and subsurface layers of clay loam over hard, fractured, unweathered mudstone bedrock. They are in the perudic soil moisture regime.

Bw2—13 to 18 inches; very dark grayish brown (10YR 3/2) clay loam; moderate very fine and fine subangular blocky structure; hard, firm, slightly sticky, moderately plastic; common very fine and fine roots; common very fine and fine irregular pores; common distinct pressure faces on peds; about 10 percent, by volume, pebbles; neutral; abrupt wavy boundary.

C—18 to 25 inches; brown (10YR 4/3) loam; massive; hard, firm, slightly sticky, moderately plastic; few very fine and fine roots; common very fine and fine irregular pores; neutral; abrupt wavy boundary.

Cr—25 to 50 inches; moderately weathered, unconsolidated mudstone.

R—50 to 80 inches; hard, fractured, consolidated mudstone.

Range in Characteristics

Thickness of the solum: 4 to 12 inches

Depth to fractured bedrock: 10 to 25 inches

Depth to bedrock: 18 to 50 inches

Content (by volume) and size of rock fragments: Less than 35 percent pebbles throughout

Reaction: Slightly acid or neutral throughout, except where the surface has been limed

A or Ap horizon:

Color—hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 to 3

Texture—clay loam or gravelly clay loam

Bw horizon:

Color—hue of 10YR or 2.5Y, value of 3 to 6, and chroma of 1 to 3

Texture—clay loam or gravelly clay loam

C horizon (where present):

Color—hue of 7.5YR or 10YR, value of 4 to 6, and chroma of 3 to 8

Texture—loam or gravelly loam

Cr layer:

Type of bedrock—moderately weathered, unconsolidated, fractured mudstone that can be excavated with difficulty using hand tools and is rippable by mechanical equipment

R layer:

Type of bedrock—hard, fractured, consolidated mudstone

San Antón Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderate

Parent material: Stratified alluvial deposits of mixed origin

Landscape: River valleys

Landform: Flood plains

Commonly associated soils: Cortada, La Luna, and Vayas soils

Slope: 0 to 2 percent

Taxonomic class: Fine-loamy, mixed, superactive, isohyperthermic Cumulic Haplustolls

Typical Pedon

San Antón clay loam, 0 to 2 percent slopes, occasionally flooded; about 1.3 miles northeast from the intersection of Puerto Rico Highways 116 and 334; about 0.9 mile west of the community of La Joya; about 200 feet east of Puerto Rico Highway 116, in cropland; Guánica Municipality; USGS Guánica topographic quadrangle (1966); lat. 17 degrees 59 minutes 58 seconds N. and long. 66 degrees 53 minutes 25 seconds W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) clay loam; weak medium subangular blocky structure parting to moderate fine granular; slightly hard, friable, sticky, plastic; many fine roots; common very fine and few fine tubular pores; slightly alkaline; clear smooth boundary.

- A—8 to 13 inches; very dark grayish brown (10YR 3/2) clay loam; weak coarse prismatic structure parting to moderate fine subangular blocky; slightly hard, friable, sticky, plastic; few very fine roots; few very fine tubular pores; slightly alkaline; clear smooth boundary.
- Bw1—13 to 24 inches; very dark grayish brown (10YR 3/2) and dark brown (10YR 3/3) silty clay loam; moderate fine subangular blocky structure; slightly hard, firm, sticky, plastic; few very fine roots; few very fine tubular pores; slightly alkaline; clear smooth boundary.
- Bw2—24 to 31 inches; very dark grayish brown (10YR 3/2) and dark brown (10YR 3/3) clay loam; moderate fine subangular blocky structure; slightly hard, friable, sticky, plastic; few very fine roots; few very fine tubular pores; moderately alkaline; abrupt smooth boundary.
- Bw3—31 to 41 inches; very dark grayish brown (10YR 3/2) sandy clay loam; weak coarse prismatic structure; soft, very friable, slightly sticky, moderately plastic; few very fine and fine roots; few very fine tubular pores; slightly alkaline; abrupt smooth boundary.
- Bw4—41 to 54 inches; dark brown (10YR 3/3) sandy clay loam; weak coarse prismatic structure parting to weak medium angular blocky; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine roots; few very fine tubular pores; slightly alkaline; gradual smooth boundary.
- Bw5—54 to 80 inches; dark brown (10YR 3/3) sandy clay loam; weak coarse prismatic structure parting to weak medium angular blocky; soft, very friable, slightly sticky, slightly plastic; common very fine and fine roots; few very fine tubular pores; slightly alkaline.

Range in Characteristics

Thickness of the solum: 28 to more than 80 inches

Content (by volume) and size of rock fragments: 0 to less than 10 percent pebbles throughout

Reaction: Neutral to moderately alkaline throughout

A and Ap horizons:

Color—hue of 10YR, value of 2 or 3, and chroma of 2

Texture—clay loam or silty clay

Bw horizon:

Color—hue of 10YR, value of 3 or 4, and chroma of 2 or 3

Texture—sandy clay loam, clay loam, or silty clay loam

C horizon (where present):

Color—hue of 10YR, value of 3 to 5, and chroma of 3 to 6

Texture—sandy clay loam, clay loam, or clay

San Germán Series

Depth class: Shallow

Drainage class: Well drained

Permeability: Very slow

Parent material: Material weathered from limestone bedrock from the Cretaceous Period

Landscape: Hills

Landform: Hillslopes

Commonly associated soils: Aguilita, Descalabrado, Duey, and Pozo Blanco soils

Slope: 5 to 60 percent

Taxonomic class: Clayey-skeletal, mixed, superactive, isohyperthermic Lithic Haplustolls

Typical Pedon

San Germán cobbly clay loam (fig. 32) in an area of San Germán-Duey complex, 20 to 60 percent slopes; about 4.4 miles southwest of downtown Cabo Rojo from the intersection of Puerto Rico Highways 102 and 312; about 2.5 miles northwest of the community of Boquerón from the intersection of Puerto Rico Highways 100 and 101; about 0.4 mile west of Puerto Rico Highway 307; about 0.1 mile west of an old railroad track, in naturalized pastureland; Cabo Rojo Municipality; USGS Puerto Real topographic quadrangle (1966); lat. 18 degrees 2 minutes 46 seconds N. and long. 67 degrees 11 minutes 38 seconds W.



Figure 32.—Profile of a San Germán soil in an area of San Germán-Duey complex, 20 to 60 percent slopes. San Germán soils are characterized by cobbly surface and subsurface layers of clay loam over hard, unweathered limestone bedrock. They are in the ustic soil moisture regime.

Ap—0 to 4 inches; very dark grayish brown (10YR 3/2) cobbly clay loam; strong fine granular structure; slightly hard, firm, slightly sticky, moderately plastic; many very fine and fine roots; many very fine and fine irregular pores; about 12 percent, by volume, pebbles and 8 percent cobbles; slightly alkaline; violently effervescent; clear wavy boundary.

A—4 to 10 inches; very dark grayish brown (10YR 3/2) extremely gravelly clay loam; strong fine granular structure; slightly hard, firm, slightly sticky, moderately plastic; many very fine, fine, and medium roots; many very fine, fine, and medium irregular pores; about 85 percent, by volume, pebbles; moderately alkaline; violently effervescent; abrupt irregular boundary.

R—10 to 80 inches; hard, consolidated limestone bedrock.

Range in Characteristics

Thickness of the solum: 5 to 10 inches

Depth to bedrock: 10 to 20 inches

Content (by volume) and size of rock fragments: 10 to 90 percent pebbles and cobbles in the A and Ap horizons and 35 to 90 percent pebbles in the AC and C horizons, where present

Reaction: Slightly alkaline or moderately alkaline throughout

A and Ap horizons:

Color—hue of 10YR, value of 3 or 4, and chroma of 2 or 3

Texture—clay loam, clay, or their gravelly to extremely gravelly analogs or cobbly analogs

AC horizon (where present):

Color—hue of 10YR, value of 4 or 5, and chroma of 3 to 6

Texture—clay loam, clay, or their very gravelly or extremely gravelly analogs

C horizon (where present):

Color—hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 1 to 4

Texture—clay loam, clay, or their very gravelly or extremely gravelly analogs

Cr layer (where present):

Type of bedrock—hard, semiconsolidated, fractured limestone bedrock that can be excavated with difficulty using hand tools and is rippable by mechanical equipment

R layer:

Type of bedrock—hard, unweathered limestone bedrock

Santa Isabel Series

Depth class: Very deep

Drainage class: Moderately well drained

Permeability: Very slow

Parent material: Clayey alluvial sediments that weathered from igneous, metamorphic, and sedimentary rocks

Landscape: Basins and alluvial plains

Landform: Fan skirts

Commonly associated soils: Aguirre, Cartagena, Fé, Fraternidad, and Guánica soils

Slope: 0 to 2 percent

Taxonomic class: Fine, smectitic, isohyperthermic Typic Haplusterts

Typical Pedon

Santa Isabel clay, 0 to 2 percent slopes; about 1.6 miles southwest of the city of Lajas from the intersection of Puerto Rico Highways 315 and 101; about 0.3 mile northeast

from the intersection of Puerto Rico Highways 303 and 101; about 330 feet south of the Administration Building of the Lajas Agricultural Experiment Station of the University of Puerto Rico-Mayagüez Campus; Lajas Municipality; USGS San Germán topographic quadrangle (1966); lat. 18 degrees 1 minute 59 seconds N. and long. 67 degrees 4 minutes 26 seconds W.

Ap—0 to 10 inches; black (10YR 2/1) clay; weak fine granular structure; firm, sticky, plastic; many fine roots; neutral; clear wavy boundary.

ABss1—10 to 28 inches; black (10YR 2/1) clay; weak medium angular blocky structure; firm, sticky, plastic; many fine roots; common distinct slickensides having polished and grooved surfaces; neutral; gradual wavy boundary.

ABss2—28 to 39 inches; very dark gray (10YR 3/1) clay; weak medium angular blocky structure; firm, sticky, plastic; common fine roots; many distinct slickensides having polished and grooved surfaces; neutral; gradual wavy boundary.

ABss3—39 to 50 inches; very dark gray (10YR 3/1) clay; weak medium angular blocky structure; firm, sticky, plastic; few fine roots; many distinct slickensides having polished and grooved surfaces; neutral; gradual wavy boundary.

ABss4—50 to 64 inches; black (10YR 2/1) clay; weak medium angular blocky structure; firm, sticky, plastic; few fine roots; many distinct slickensides having polished and grooved surfaces; few fine subrounded volcanic rock fragments; neutral; gradual wavy boundary.

BC—64 to 69 inches; brown (10YR 4/3) clay; massive; firm, sticky, plastic; very dark gray (10YR 3/1) coatings along faces of peds; few fine subrounded volcanic rock fragments; neutral.

Range in Characteristics

Thickness of the solum: More than 60 inches

Content (by volume) and size of rock fragments: Less than 5 percent mixed (igneous, metamorphic, and sedimentary) pebbles

Reaction: Neutral or slightly alkaline throughout

A or Ap horizon:

Color—hue of 10YR, value of 2 or 3, and chroma of 1

Texture—clay loam or clay

ABss horizon:

Color—hue of 10YR, value of 2 or 3, and chroma of 1

Texture—clay

Slickensides—few to many

BC horizon:

Color—hue of 10YR, value of 2 to 4, and chroma of 1 to 3

Texture—clay

Santa Marta Series

Depth class: Moderately deep

Drainage class: Well drained

Permeability: Moderate

Parent material: Residuum that weathered from serpentinite bedrock

Landscape: Hills

Landform: Hillslopes

Commonly associated soils: El Cacique, La Taína, Maresúa, Nipe, and Rosario soils

Slope: 20 to 40 percent

Taxonomic class: Fine, magnesian, isohyperthermic Typic Kanhapludalfs

Typical Pedon

Santa Marta gravelly clay loam, 20 to 40 percent slopes; about 1.0 mile northwest of downtown San Germán from the intersection of Puerto Rico Highways 102 and 347; about 0.5 mile northwest of the water company aqueduct near the Interamerican University-San Germán Campus; about 300 feet north of a paved road, in forestland; San Germán Municipality; USGS San Germán topographic quadrangle (1966); lat. 18 degrees 5 minutes 31 seconds N. and long. 67 degrees 3 minutes 23 seconds W.

Ap—0 to 8 inches; dark brown (7.5YR 3/3) gravelly clay loam; weak fine and medium granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine, fine, and medium and common coarse roots; many very fine and fine and few medium and coarse interstitial pores; about 20 percent, by volume, pebbles; neutral; clear wavy boundary.

Bt1—8 to 21 inches; dark reddish brown (5YR 3/4) paragravelly clay; weak fine and medium subangular blocky structure; soft, friable, moderately sticky, moderately plastic; common faint and few distinct clay films on faces of peds and in pore linings; common fine and medium and few coarse roots; many very fine and fine irregular and few medium and coarse tubular pores; about 20 percent, by volume, parapebbles; slightly acid; clear wavy boundary.

Bt2—21 to 37 inches; dark reddish brown (2.5YR 3/4) very paragravelly clay; weak fine subangular blocky structure; soft, very friable, slightly sticky, moderately plastic; few distinct clay films on faces of peds; common medium and few coarse roots; many very fine and few medium and coarse irregular pores; slightly acid; abrupt irregular boundary.

Cr—37 to 57 inches; highly fractured serpentinite bedrock; abrupt irregular boundary.

R—57 inches; hard, consolidated serpentinite bedrock.

Range in Characteristics

Thickness of the solum: 20 to 40 inches

Depth to bedrock: 20 to 40 inches to highly fractured serpentinite bedrock and 33 to 64 inches to hard, consolidated bedrock

Content (by volume) and size of rock fragments: 5 to 20 percent pebbles in the Ap horizon and 15 to 30 percent parapebbles in the Bt horizon

Reaction: Strongly acid to neutral throughout

A or Ap horizon:

Color—hue of 2.5YR to 7.5YR, value of 3 to 5, and chroma of 3 to 6

Texture in the fine-earth fraction—clay loam or clay

Bt horizon:

Color—hue of 2.5YR or 5YR, value of 3 or 4, and chroma of 4 to 6

Texture in the fine-earth fraction—clay loam or clay

Cr layer:

Type of bedrock—highly fractured serpentinite bedrock that can be excavated with difficulty using hand tools and is rippable by mechanical equipment

R layer:

Type of bedrock—hard, consolidated serpentinite bedrock

Seboruco Series

Depth class: Moderately deep

Drainage class: Well drained

Permeability: Slow

Parent material: Shallow marine sediments overlying limestone bedrock

Landscape: Hills

Landform: Ridges and hillslopes

Commonly associated soils: Altamira, Costa, La Covana, and Pitahaya soils

Slope: 2 to 90 percent

Taxonomic class: Fine-loamy, mixed, superactive, isohyperthermic Typic Calciargids

Typical Pedon

Seboruco silty clay loam in an area of La Covana-Limestone outcrop-Seboruco complex, 12 to 40 percent slopes; in Guánica State Forest; about 1.4 miles southeast of the community of La Luna; about 1,300 feet south of a road junction; about 50 feet northwest of a road, in forestland; Guánica Municipality; USGS Guánica topographic quadrangle (1966); lat. 17 degrees 58 minutes 4 seconds N. and long. 66 degrees 52 minutes 54 seconds W.

A—0 to 2 inches; dusky red (10R 3/4) silty clay loam; weak fine granular structure; soft, very friable, sticky, plastic; many very fine and fine and common medium and coarse roots; about 5 percent, by volume, pebbles; violently effervescent; moderately alkaline; clear smooth boundary.

Bt1—2 to 7 inches; dark reddish brown (2.5YR 2.5/4) silty clay loam; moderate medium subangular blocky structure; soft, very friable, sticky, plastic; many very fine and fine and few medium and coarse roots; common faint clay films on faces of peds; about 5 percent, by volume, pebbles; common distinct shell fragments; violently effervescent; moderately alkaline; clear wavy boundary.

Bt2—7 to 11 inches; dark red (2.5YR 3/6) gravelly silty clay; weak medium subangular blocky structure; soft, friable, sticky, plastic; common very fine and fine and many medium and coarse roots; common faint clay films on faces of peds; about 40 percent, by volume, pebbles; many distinct shell fragments; violently effervescent; moderately alkaline; clear wavy boundary.

Bk1—11 to 19 inches; reddish yellow (5YR 6/6) gravelly silt loam; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, nonplastic; few very fine and fine roots; common prominent 2- to 10-centimeter wide tongues filled with dark red (2.5YR 3/6) material from the overlying horizon; about 20 percent, by volume, pebbles; many distinct shell fragments; many prominent pink (7.5YR 8/4) soft masses of calcium carbonate; violently effervescent; slightly alkaline; abrupt wavy boundary.

Bk2—19 to 26 inches; reddish yellow (7.5YR 6/6) gravelly silt loam; weak fine subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; few very fine and fine roots; about 5 percent, by volume, pebbles; common prominent pink (7.5YR 8/4) soft masses of calcium carbonate; violently effervescent; slightly alkaline; abrupt wavy boundary.

C—26 to 31 inches; red (2.5YR 4/8) loam; massive; soft, very friable, slightly sticky, nonplastic; few very fine, fine, and medium roots; few fine and medium prominent pink (7.5YR 8/4) soft masses of calcium carbonate; violently effervescent; moderately alkaline; abrupt wavy boundary.

R—31 inches; hard, consolidated limestone bedrock.

Range in Characteristics

Thickness of the solum: 20 to 40 inches

Depth to bedrock: 20 to 40 inches

Content (by volume) and size of rock fragments: 0 to 10 percent pebbles in the A horizon and 5 to 30 percent pebbles in the Bt, Bk, and C horizons

Reaction: Slightly alkaline or moderately alkaline in the A or Ap horizon and moderately alkaline in the Bk, Btk and C horizons

A or Ap horizon:

Color—hue of 10R or 2.5YR, value of 2.5 or 3, and chroma of 2 to 4

Texture—silt loam or silty clay loam

Bt horizon:

Color—hue of 10R or 2.5YR, value of 2.5 to 4, and chroma of 3 to 6

Texture—silty clay loam, silty clay, or their gravelly analogs

Bk horizon:

Color—hue of 2.5YR to 10YR, value of 5 to 8, and chroma of 3 to 6

Texture—silt loam, silty clay loam, silty clay, or their gravelly analogs

Calcium carbonate—common or many masses, nodules, filaments, or concretions

C horizon:

Color—hue of 2.5YR or 5YR, value of 3 or 4, and chroma of 4 to 8

Texture—loam, silt loam, or their gravelly analogs

Calcium carbonate—few or common masses, nodules, filaments, or concretions

R layer:

Type of bedrock—hard, unconsolidated limestone bedrock

Serrano Series

Depth class: Very deep

Drainage class: Poorly drained

Permeability: Rapid

Parent material: Moderately fine material over coarse-textured sediments

Landscape: Coastal plains

Landform: Tidal flats

Commonly associated soils: Bahía Salinas, Boquerón, Manglillo, and Teresa soils

Slope: 0 to 2 percent

Taxonomic class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive, nonacid, isohyperthermic Typic Endoaquepts

Typical Pedon

Serrano sandy loam in an area of Manglillo, Boquerón, and Serrano soils, very frequently flooded; about 4.1 miles southeast of the community of Pole Ojea from the intersection of Puerto Rico Highways 301 and 3301; about 1.9 miles south on La Pitahaya road from its intersection with Puerto Rico Highway 303; about 1,000 feet east of the road, in an area of wildlife habitat; Cabo Rojo Municipality; USGS Cabo Rojo topographic quadrangle (1966); lat. 17 degrees 57 minutes 16 seconds N. and long. 67 degrees 7 minutes 43 seconds W.

A—0 to 3 inches; olive gray (5Y 5/2) sandy loam; massive; very friable, nonsticky, nonplastic; many fine roots; about 12 percent, by volume, pebbles; strongly effervescent; moderately alkaline; clear wavy boundary.

Bwg—3 to 14 inches; greenish gray (10Y 5/1) loam; weak fine subangular blocky structure; very friable, slightly sticky, slightly plastic; many fine and medium roots; about 10 percent, by volume, pebbles; strongly effervescent; moderately alkaline; clear wavy boundary.

Cg1—14 to 22 inches; greenish gray (10Y 6/1) very gravelly loam; massive; very friable, slightly sticky, slightly plastic; about 45 percent, by volume, pebbles; strongly effervescent; moderately alkaline; abrupt wavy boundary.

Cg2—22 to 65 inches; dark greenish gray (10Y 4/1) extremely gravelly loamy sand; massive; very friable, nonsticky, nonplastic; about 80 percent, by volume, pebbles; strongly effervescent; moderately alkaline.

Range in Characteristics

Thickness of the solum: 14 to 17 inches

Content (by volume) and size of rock fragments: 0 to less than 15 percent pebbles in the A and Bwg horizons and 40 to more than 80 percent pebbles in Cg horizon

Reaction: Moderately alkaline throughout

A horizon:

Color—hue of 5Y, value of 5 or 6, and chroma of 2

Texture—sandy loam

Bwg horizon:

Color—hue of 10Y to 10GY, value of 5 or 6, and chroma of 1

Texture—sandy clay loam or loam

Redoximorphic features—few or common iron depletions in shades of green and gray and none to few masses of iron accumulation in shades of brown and yellow

Cg horizon (upper part):

Color—hue of 10Y, value of 6, and chroma of 1

Texture—loam, very gravelly loam, or extremely gravelly loam

Cg horizon (lower part):

Color—hue of 10Y, value of 4 to 6, and chroma of 1

Texture—loamy sand, very gravelly loamy sand, or extremely gravelly loamy sand

Sosa Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderately slow

Parent material: Clayey and loamy marine sediments

Landscape: Coastal plains

Landform: Marine terraces

Commonly associated soils: Bahía, Bahía Salinas, Guayabo, and Melones soils

Slope: 2 to 12 percent

Taxonomic class: Fine, kaolinitic, isohyperthermic Aridic Haplustalfs

Typical Pedon

Sosa sandy loam in an area of Urban land-Sosa complex, 5 to 12 percent slopes; about 0.25 mile south of the community of Betances from the intersection of Puerto Rico Highways 101 and 103; about 100 feet west of a paved road, in pastureland; Cabo Rojo Municipality; USGS Puerto Real topographic quadrangle (1966); lat. 18 degrees 1 minute 35 seconds N. and long. 67 degrees 8 minutes 15 seconds W.

Ap—0 to 5 inches; dark reddish brown (5YR 3/3) sandy loam; weak fine granular structure; soft, very friable, nonsticky, nonplastic; many fine roots; about 3 percent, by volume, ironstone nodules; moderately acid; clear smooth boundary.

A—5 to 12 inches; dark reddish brown (5YR 3/3) sandy loam; weak coarse subangular blocky structure; hard, friable, nonsticky, slightly plastic; many fine roots; about 14 percent, by volume, ironstone nodules; slightly acid; clear smooth boundary.

BA—12 to 20 inches; 70 percent dark red (2.5YR 3/6) and 30 percent dark reddish brown (5YR 3/3) sandy clay; massive; hard, friable, slightly sticky, slightly plastic; few fine roots; common faint clay films on faces of peds; about 12 percent, by volume, ironstone nodules; neutral; clear smooth boundary.

Bt1—20 to 33 inches; red (2.5YR 4/6) sandy clay; moderate medium subangular blocky structure; very hard, firm, slightly sticky, slightly plastic; common faint clay

films on faces of peds; about 6 percent, by volume, ironstone nodules; many medium distinct dark red (10R 3/6) and strong brown (7.5YR 5/8) reticulate areas of iron accumulation and light gray (10YR 7/1) reticulate iron depletions; neutral; gradual wavy boundary.

Bt2—33 to 63 inches; red (2.5YR 4/6) sandy clay loam; weak medium subangular blocky structure; very hard, extremely firm, slightly sticky, slightly plastic; few faint clay films on faces of peds; about 1 percent, by volume, ironstone nodules; many medium distinct dark red (10R 3/6) and strong brown (7.5YR 5/8) reticulate areas of iron accumulation and light gray (10YR 7/1) reticulate iron depletions; neutral.

Range in Characteristics

Thickness of the solum: More than 60 inches

Content (by volume) and size of rock fragments: Less than 15 percent ironstone nodules throughout

Reaction: Moderately acid or slightly acid in the A, Ap, and BA horizons and slightly acid or neutral in the Bt horizon

A and Ap horizons:

Color—hue of 5YR to 10YR, value of 3 or 4, and chroma of 3 or 4

Texture—loamy fine sand, fine sandy loam, or sandy loam

BA horizon (where present):

Color—hue of 2.5YR to 7.5YR, value of 3 to 6, and chroma of 3 to 6

Texture—sandy clay loam or sandy clay

Bt horizon:

Color—hue of 10R or 2.5YR, value of 4 or 5, and chroma of 6 to 8; few to many reticulate mottles in shades of red, brown, and gray

Texture—sandy clay loam or sandy clay

Teresa Series

Depth class: Very deep

Drainage class: Somewhat poorly drained

Permeability: Very slow

Parent material: Clayey marine sediments

Landscape: Coastal plains

Landform: Alluvial flats

Commonly associated soils: Boquerón, Cartagena, Manglillo, Olivares, and Serrano soils

Slope: 0 to 1 percent

Taxonomic class: Very-fine, smectitic, isohyperthermic Sodic Haplusterts

Typical Pedon

Teresa clay, 0 to 1 percent slopes; about 5.4 miles south of downtown Cabo Rojo; about 1.1 miles south of the community of Las Arenas community on Puerto Rico Highway 301 from its intersection with Puerto Rico Highway 101; about 0.2 mile east of Puerto Rico Highway 301, in pastureland; Cabo Rojo Municipality; USGS Puerto Real topographic quadrangle (1966); lat. 18 degrees 0 minutes 33 seconds N. and long. 67 degrees 8 minutes 49 seconds W.

Ap—0 to 10 inches; very dark gray (10YR 3/1) clay; moderate medium subangular blocky structure; hard, firm, very sticky, very plastic; many very fine and fine roots; many very fine interstitial pores; neutral; clear wavy boundary.

Bss1—10 to 26 inches; very dark gray (10YR 3/1) clay; strong coarse prismatic structure; very hard, very firm, very sticky, very plastic; many very fine and

fine roots; few medium tubular and vesicular pores; many large slickensides having distinct polished and grooved surfaces; few distinct soft masses of iron-manganese; slightly alkaline; gradual wavy boundary.

Bss2—26 to 38 inches; very dark grayish brown (10YR 3/2) clay; strong coarse prismatic structure; very hard, very firm, very sticky, very plastic; common very fine and fine roots; many very fine, common fine, and few medium tubular and vesicular pores; many large slickensides having distinct polished and grooved surfaces; few distinct soft masses of iron-manganese; few fine prominent yellowish brown (10YR 5/8) masses of iron accumulation on faces of peds and slickensides; slightly alkaline; gradual wavy boundary.

Bssz—38 to 44 inches; very dark grayish brown (10YR 3/2) clay; weak coarse prismatic structure; very hard, very firm, very sticky, very plastic; few very fine and fine roots; many very fine, common fine, and few medium tubular and vesicular pores; common large slickensides having distinct polished and grooved surfaces; few distinct soft masses of calcium carbonate; few distinct salt crystals; few distinct soft masses of iron-manganese; few medium prominent yellowish brown (10YR 5/8) masses of iron accumulation on faces of peds and slickensides; slightly alkaline; clear wavy boundary.

Bsszg1—44 to 62 inches; dark brown (10YR 3/3) clay; weak medium subangular blocky structure; very hard, very firm, very sticky, very plastic; few very fine and fine roots; many very fine, common fine, and few medium tubular and vesicular pores; common large slickensides having distinct polished and grooved surfaces; common distinct salt crystals; few distinct soft masses of iron-manganese; common medium distinct olive brown (2.5Y 4/4) masses of iron accumulation; slightly alkaline; gradual wavy boundary.

Bsszg2—62 to 78 inches; brown (10YR 4/3) clay; weak medium subangular blocky structure; very hard, very firm, very sticky, very plastic; few very fine, fine, and medium roots; many very fine, common fine, and few medium tubular and vesicular pores; many large slickensides having distinct polished and grooved surfaces; many distinct salt crystals; many distinct soft masses of iron-manganese; few medium prominent yellowish brown (10YR 5/8) masses of iron accumulation; common medium prominent dark gray (2.5Y 4/1) iron depletions; slightly alkaline; clear wavy boundary.

Bgz—78 to 85 inches; dark gray (2.5Y 4/1) clay; weak medium subangular blocky structure; very hard, very firm, very sticky, very plastic; few very fine and fine roots; many very fine, common fine, and few medium tubular and vesicular pores; few faint salt crystals; common distinct soft masses of iron-manganese; common prominent yellowish brown (10YR 5/6) masses of iron accumulation; slightly alkaline.

Range in Characteristics

Thickness of the solum: More than 80 inches

Content (by volume) and size of rock fragments: Less than 5 percent pebbles throughout

Reaction: Neutral to strongly alkaline throughout

A or Ap horizon:

Color—hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 1 to 3

Texture—clay

Bss horizon:

Color—hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 1 or 2

Texture—clay

Redoximorphic features—few to many masses of iron accumulation in shades of brown and yellow on surfaces of peds and slickensides

Iron-manganese concretions—few to many

Bssz horizon:

Color—hue of 7.5YR or 10YR, value of 2 to 4, and chroma of 1 to 4; or no dominant color and multicolored in shades brown and yellow

Texture—clay

Redoximorphic features—few to many masses of iron accumulation in shades of brown on surfaces of peds and slickensides; few to many small faint salt crystals

Calcium carbonate—none to common soft masses

Iron-manganese concretions—few to many

Bsszg horizon:

Color—hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 1 to 4

Texture—clay

Redoximorphic features—few to many masses of iron accumulation in shades of brown on surfaces of peds and slickensides; few to many small faint salt crystals

Iron-manganese concretions—few to many

Bgz horizon:

Color—hue of 7.5YR to 2.5Y, value of 3 to 5, and chroma of 1 or 2

Texture—clay

Redoximorphic features—few to many masses of iron accumulation in shades of brown on surfaces of peds and slickensides; few to many small faint salt crystals

Iron-manganese concretions—few to many

Toa Series

Depth class: Very deep

Drainage class: Well drained

Permeability: Moderate

Parent material: Stratified alluvium of mixed origin

Landscape: River valleys

Landform: Flood plains

Commonly associated soils: Bajura, Coloso, Dique, Lares, Mabí, Maní, Montegrando, and Reilly soils

Slope: 0 to 2 percent

Taxonomic class: Fine, mixed, active, isohyperthermic Fluventic Hapludolls

Typical Pedon

Toa clay loam, 0 to 2 percent slopes, occasionally flooded; about 0.9 mile southwest of the community of Lavadero from the intersection of Puerto Rico Highways 2 and 345; about 0.4 mile south of Puerto Rico Highway 345 on a dirt road; about 600 feet southeast of the dirt road, in an old sugarcane field; Hormigueros Municipality; USGS Rosario topographic quadrangle (1966); lat. 18 degrees 7 minutes 31 seconds N. and long. 67 degrees 6 minutes 47 seconds W.

Ap—0 to 8 inches; dark brown (10YR 3/3) clay loam; weak fine granular structure; friable, slightly sticky, slightly plastic; common fine roots; about 3 percent, by volume, pebbles; strongly acid; clear smooth boundary.

AB—8 to 17 inches; dark brown (10YR 3/3) clay loam; weak medium subangular blocky structure parting to weak fine granular; friable, slightly sticky, slightly plastic; few fine roots; neutral; clear smooth boundary.

Bw1—17 to 29 inches; dark yellowish brown (10YR 3/4) silty clay loam; weak medium and coarse subangular blocky structure; friable, slightly sticky, slightly plastic; few

fine roots; few distinct brown (7.5YR 4/4) masses of iron accumulation; slightly alkaline; clear smooth boundary.

Bw2—29 to 43 inches; brown (10YR 4/3) silty clay; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; few fine distinct reddish brown (5YR 5/3) masses of iron accumulation; slightly alkaline; clear smooth boundary.

BC—43 to 65 inches; dark yellowish brown (10YR 4/4) silty clay; massive; friable, slightly sticky, slightly plastic; few fine black (10YR 2/1) manganese concretions; few fine faint yellowish brown (10YR 5/6) masses of iron accumulation; few fine faint light gray (10YR 7/1) iron depletions; slightly alkaline.

Range in Characteristics

Thickness of the solum: 20 to 40 inches

Content (by volume) and size of rock fragments: Less than 15 percent pebbles in the A, Bw, and BC horizons and in the AB or BA horizon; and 20 to 80 percent pebbles in the 2C horizon, where present

Reaction: Strongly acid to neutral in the Ap and AB horizons and slightly alkaline in the Bw, BC, and C horizons

A or Ap horizon:

Color—hue of 10YR or 2.5Y, value of 2 to 3, and chroma of 1 to 3

Texture—silty clay loam, clay loam, or clay

AB or BA horizon:

Color—hue of 10YR, value of 3, and chroma of 1 to 3

Texture—sandy clay loam, silty clay loam, clay loam, or clay

Bw horizon:

Color—hue of 10YR, value of 3 or 4, and chroma of 1 to 4

Texture—clay loam, silty clay loam, silty clay, or sandy clay

Redoximorphic features—few or common masses of iron accumulation in shades of red and brown

BC or C horizon (where present):

Color—hue of 10YR or 2.5Y, value of 3 to 5, and chroma of 1 to 6

Texture—silty clay loam, clay loam, silty clay, or sandy clay

Redoximorphic features—few or common iron depletions in shades of gray and few to many masses of iron accumulation in shades of red and brown

2C horizon (where present):

Color—hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 1 to 6

Texture—coarse sand, loamy coarse sand, or their gravelly to extremely gravelly analogs

Redoximorphic features—few or common iron depletions in shades of gray and few to many masses of iron accumulation in shades of red and brown

Vayas Series

Depth class: Very deep

Drainage class: Poorly drained

Permeability: Slow

Parent material: Fine-textured alluvium of mixed origin

Landscape: River valleys

Landform: Flood plains

Commonly associated soils: Cortada, La Luna, and San Antón soils

Slope: 0 to 2 percent

Taxonomic class: Fine, smectitic, isohyperthermic Vertic Endoaquolls

Typical Pedon

Vayas silty clay, 0 to 2 percent slopes, occasionally flooded; about 0.9 mile southeast of downtown Yauco from the intersection of Puerto Rico Highways 368 and 371; about 0.3 mile southeast from the intersection of Puerto Rico Highways 2 and 359; about 1,000 feet south of Puerto Rico Highway 359 on a dirt road; about 100 feet south of the dirt road, in a banana plantation; Yauco Municipality; USGS Yauco topographic quadrangle (1964); lat. 18 degrees 1 minute 52 seconds N. and long. 66 degrees 50 minutes 16 seconds W.

Ap—0 to 5 inches; very dark grayish brown (10YR 3/2) silty clay; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, moderately plastic; few faint pressures faces on faces of peds; few fine roots; common fine irregular pores; slightly alkaline; clear smooth boundary.

Bw—5 to 12 inches; very dark grayish brown (10YR 3/2) silty clay loam; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, moderately plastic; few prominent pressures faces on faces of peds; few fine roots; common fine irregular and few fine tubular pores; slightly alkaline; clear smooth boundary.

Bwg—12 to 23 inches; dark grayish brown (2.5Y 4/2) silty clay loam; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, moderately plastic; few fine roots; common fine irregular and few fine tubular pores; many distinct dark yellowish brown (10YR 4/4) masses of iron accumulation; common prominent very dark greenish gray (10Y 3/1) iron depletions; neutral; clear smooth boundary.

Cg1—23 to 49 inches; 50 percent olive gray (5Y 4/2) and 50 percent brown (10YR 4/3) silty clay loam; massive; slightly hard, friable, slightly sticky, moderately plastic; common distinct dark yellowish brown (10YR 4/4) masses of iron accumulation; common prominent very dark greenish gray (10Y 3/1) iron depletions; neutral; clear smooth boundary.

Cg2—49 to 65 inches; olive gray (5Y 4/2) silty clay loam; massive; slightly hard, friable, slightly sticky, moderately plastic; common distinct dark yellowish brown (10YR 4/4) masses of iron accumulation; common prominent dark greenish gray (10Y 4/1) iron depletions; neutral.

Range in Characteristics

Thickness of the solum: 15 to 25 inches

Content (by volume) and size of rock fragments: Less than 15 percent pebbles throughout

Reaction: Neutral to moderately alkaline throughout

A or Ap horizon:

Color—hue of 10YR or 2.5Y, value of 2.5 to 4, and chroma of 1 or 2

Texture—silty clay loam or clay

Bw horizon:

Color—hue of 10YR or 2.5Y, value of 2.5 or 3, and chroma of 1 or 2

Texture—silty clay loam, clay loam, or clay

Bwg horizon:

Color—hue of 2.5Y, value of 2.5 to 4, and chroma of 1 or 2; or neutral in hue and value of 2.5 to 4

Texture—silty clay loam, silty clay, or clay

Iron accumulations—few or common in shades of brown

Iron depletions—few or common in shades of gray

Cg horizon:

Color—hue of 10YR to 5GY, value of 4 or 5, and chroma of 1 to 4

Texture—loam, silt loam, silty clay loam, or silty clay

Iron accumulations—few to many in shades of brown

Iron depletions—few to many in shades of gray

Voladora Series

Depth class: Very deep

Drainage class: Moderately well drained

Permeability: Slow

Parent material: Fine textured, volcanic and marine sediments

Landscape: Hills

Landform: Hillslopes

Commonly associated soils: Cabo Rojo, Delicias, Guanajibo, and Nipe soils

Slope: 5 to 20 percent

Taxonomic class: Very-fine, mixed, active, isohyperthermic Plinthic Haplohumults

Typical Pedon

Voladora clay, 5 to 12 percent slopes; about 1.7 miles southwest of downtown Cabo Rojo from the intersection of Puerto Rico Highways 102 and 312; about 0.6 mile northwest from intersection of Puerto Rico Highways 307 and 308; about 1,800 feet north of Puerto Rico Highway 308 on a dirt road; Cabo Rojo Municipality; USGS Puerto Real topographic quadrangle (1966); lat. 18 degrees 5 minutes 4 seconds N. and long. 67 degrees 10 minutes 12 seconds W.

Ap—0 to 2 inches; brown (7.5YR 4/4) clay; strong fine and medium granular structure; slightly hard, friable, moderately sticky, very plastic; many fine and medium roots; many fine and medium interstitial pores; strongly acid; clear smooth boundary.

Bt1—2 to 8 inches; dark reddish brown (2.5YR 3/4) clay; strong fine and medium subangular blocky structure; hard, firm, moderately sticky, very plastic; many distinct clay films on faces of peds; many fine and medium roots; common fine and medium irregular pores; few fine distinct dark red (10R 3/6) masses of iron accumulation; very strongly acid; clear smooth boundary.

Bt2—8 to 15 inches; dark reddish brown (2.5YR 3/4) clay; strong fine and medium subangular blocky structure; slightly hard, firm, moderately sticky, very plastic; many prominent clay films on faces of peds; few fine and medium roots; few fine irregular and tubular pores; very strongly acid; clear wavy boundary.

Btv1—15 to 20 inches; dark reddish brown (2.5YR 3/4) clay; moderate fine and medium subangular blocky structure; slightly hard, firm, moderately sticky, very plastic; common fine prominent strong brown (7.5YR 5/6) and common fine prominent very pale brown (10YR 7/4) relic iron depletions; about 5 percent, by volume, dark red (10R 3/6) plinthite; many prominent clay films on faces of peds; few fine roots; few fine irregular and tubular pores; very strongly acid; abrupt wavy boundary.

Btv2—20 to 48 inches; dark yellowish brown (10YR 4/6) clay; weak fine and medium subangular blocky structure; slightly hard, friable, moderately sticky, very plastic; common fine prominent strong brown (7.5YR 5/8) and common fine prominent very pale brown (10YR 7/3) iron depletions; about 20 percent, by volume, dark red (10R 3/6) plinthite; many prominent clay films on faces of peds; few fine roots; common fine irregular pores; very strongly acid; clear wavy boundary.

C—48 to 60 inches; brownish yellow (10YR 6/8) clay; massive; slightly hard, friable, moderately sticky, very plastic; many fine and medium prominent dark red (2.5YR 3/6) and common fine prominent strong brown (7.5YR 5/8) masses of iron accumulation; common fine and medium white (5Y 8/1) iron depletions; few fine roots; common fine vesicular pores; strongly acid.

Range in Characteristics

Thickness of the solum: 38 to more than 60 inches

Content of plinthite: 5 to 30 percent, by volume

Depth to bedrock: More than 60 inches

Reaction: Extremely acid to strongly acid throughout

Content (by volume) and size of rock fragments: Less than 15 percent pebbles in the surface layer and less than 10 percent pebbles in the subsoil and substratum

A or Ap horizon:

Color—hue of 2.5YR to 7.5YR, value of 3 or 4, and chroma of 3 or 4

Texture—clay

Redoximorphic features—none to few masses of iron accumulation in shades of red

Bt horizon:

Color—hue of 2.5YR to 10YR, value of 3 or 4, and chroma of 4 to 8

Texture—clay

Redoximorphic features—few to many masses of iron accumulation in shades of red

Btv horizon:

Color—hue of 5YR to 10YR, value of 2 to 5, and chroma of 4 to 6

Texture—clay

Redoximorphic features—few to many masses of iron accumulation in shades of brown and red

Relic features—common or many in shades of brown, yellow, and gray

C horizon:

Color—hue of 10YR, value of 6, and chroma of 8

Texture—loam, clay loam, or clay

Redoximorphic features—common or many masses of iron accumulation in shades of red, brown, gray, and white

Cv horizon (where present):

Color—hue of 7.5YR or 10YR, value of 5 or 6, and chroma of 6 to 8

Texture—clay

Redoximorphic features—common or many masses of iron accumulation in shades of red, brown, gray, and white

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Glossary

Many of the terms relating to landforms, geology, and geomorphology are defined in more detail in the “National Soil Survey Handbook” (available in local offices of the Natural Resources Conservation Service or on the Internet).

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvial fan. A low, outspread mass of loose materials and/or rock material, commonly with gentle slopes. It is shaped like an open fan or a segment of a cone. The material was deposited by a stream at the place where it issues from a narrow mountain valley or upland valley or where a tributary stream is near or at its junction with the main stream. The fan is steepest near its apex, which points upstream, and slopes gently and convexly outward (downstream) with a gradual decrease in gradient.

Alluvium. Unconsolidated material, such as gravel, sand, silt, clay, and various mixtures of these, deposited on land by running water.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Aridic. Pertaining to a soil moisture regime in which the moisture control section is, in normal years, dry in all parts for more than half of the cumulative days per year when the soil temperature at a depth of 50 centimeters from the soil surface is above 5° C and moist in some or all parts for less than 90 consecutive days when the soil temperature at a depth of 50 centimeters is above 8° C.

Aspect. The direction toward which a slope faces. Also called slope aspect.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate.....	6 to 9
High	9 to 12
Very high.....	more than 12

- Backslope.** The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.
- Backswamp.** A flood-plain landform. Extensive, marshy or swampy, depressed areas of flood plains between natural levees and valley sides or terraces.
- Base saturation.** The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.
- Base slope** (geomorphology). A geomorphic component of hills consisting of the concave to linear (perpendicular to the contour) slope that, regardless of the lateral shape, forms an apron or wedge at the bottom of a hillside dominated by colluvium and slope-wash sediments (for example, slope alluvium).
- Bedding plane.** A planar or nearly planar bedding surface that visibly separates each successive layer of stratified sediment or rock (of the same or different lithology) from the preceding or following layer; a plane of deposition. It commonly marks a change in the circumstances of deposition and may show a parting, a color difference, a change in particle size, or various combinations of these. The term is commonly applied to any bedding surface, even one that is conspicuously bent or deformed by folding.
- Bedding system.** A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.
- Bedrock.** The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.
- Bedrock-controlled topography.** A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.
- Bench terrace.** A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.
- Boulders.** Rock fragments larger than 2 feet (60 centimeters) in diameter.
- Brush management.** Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.
- Calcareous soil.** A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.
- Catena.** A sequence, or “chain,” of soils on a landscape that formed in similar kinds of parent material and under similar climatic conditions but that have different characteristics as a result of differences in relief and drainage.
- Cation.** An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.
- Cation-exchange capacity.** The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.
- Cement rock.** Shaly limestone used in the manufacture of cement.
- Chemical treatment.** Control of unwanted vegetation through the use of chemicals.
- Chiseling.** Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.
- Clay.** As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions. See Redoximorphic features.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

Colluvium. Unconsolidated, unsorted earth material being transported or deposited on side slopes and/or at the base of slopes by mass movement (e.g., direct gravitational action) and by local, unconcentrated runoff.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Concretions. See Redoximorphic features.

Conglomerate. A coarse grained, clastic sedimentary rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosion (geomorphology). A process of erosion whereby rocks and soil are removed or worn away by natural chemical processes, especially by the solvent action of running water, but also by other reactions, such as hydrolysis, hydration, carbonation, and oxidation.

Corrosion (soil survey interpretations). Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Culmination of the mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained*, *somewhat excessively drained*, *well drained*, *moderately well drained*, *somewhat poorly drained*, *poorly drained*, and *very poorly drained*. These classes are defined in the “Soil Survey Manual.”

Drainage, surface. Runoff, or surface flow of water, from an area.

Drainageway. A general term for a course or channel along which water moves in draining an area. A term restricted to relatively small, linear depressions that at some time move concentrated water and either do not have a defined channel or have only a small defined channel.

Earthy fill. See Mine spoil.

Ecological site. An area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other ecological sites in kind and/or proportion of species or in total production.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian deposit. Sand-, silt-, or clay-sized clastic material transported and deposited primarily by wind, commonly in the form of a dune or a sheet of sand or loess.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains.
Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

- Escarpment.** A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Most commonly applied to cliffs produced by differential erosion. Synonym: scarp.
- Fallow.** Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.
- Fan remnant.** A general term for landforms that are the remaining parts of older fan landforms, such as alluvial fans, that have been either dissected or partially buried.
- Fertility, soil.** The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.
- Fibric soil material (peat).** The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.
- Field moisture capacity.** The moisture content of a soil, expressed as a percentage of the oven-dry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity*, *normal moisture capacity*, or *capillary capacity*.
- Fill slope.** A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.
- Fine textured soil.** Sandy clay, silty clay, or clay.
- Flagstone.** A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.
- Flood plain.** The nearly level plain that borders a stream and is subject to flooding unless protected artificially.
- Flood-plain landforms.** A variety of constructional and erosional features produced by stream channel migration and flooding. Examples include backswamps, flood-plain splays, meanders, meander belts, meander scrolls, oxbow lakes, and natural levees.
- Flood-plain step.** An essentially flat, terrace-like alluvial surface within a valley that is frequently covered by floodwater from the present stream; any approximately horizontal surface still actively modified by fluvial scour and/or deposition. May occur individually or as a series of steps.
- Fluvial.** Of or pertaining to rivers or streams; produced by stream or river action.
- Foothills.** A region of steeply sloping hills that fringes a mountain range or high-plateau escarpment. The hills have relief of as much as 1,000 feet (300 meters).
- Footslope.** The concave surface at the base of a hillslope. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).
- Forb.** Any herbaceous plant not a grass or a sedge.
- Forest cover.** All trees and other woody plants (underbrush) covering the ground in a forest.
- Forest type.** A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.
- Genesis, soil.** The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.
- Gleyed soil.** Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.
- Graded stripcropping.** Growing crops in strips that grade toward a protected waterway.

- Grassed waterway.** A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.
- Gravel.** Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.
- Gravelly soil material.** Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.
- Green manure crop** (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.
- Ground water.** Water filling all the unblocked pores of the material below the water table.
- Hard bedrock.** Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.
- Hard to reclaim** (in tables). Reclamation is difficult after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.
- Hardpan.** A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.
- Head slope** (geomorphology). A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.
- Hemic soil material (mucky peat).** Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.
- High-residue crops.** Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.
- Hill.** A generic term for an elevated area of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline. Slopes are generally more than 15 percent. The distinction between a hill and a mountain is arbitrary and may depend on local usage.
- Hillslope.** A generic term for the steeper part of a hill between its summit and the drainage line, valley flat, or depression floor at the base of a hill.
- Horizon, soil.** A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:
- O horizon.*—An organic layer of fresh and decaying plant residue.
- A horizon.*—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.
- E horizon.*—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.
- B horizon.*—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential.

The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Hyperthermic. A soil temperature regime that has mean annual soil temperatures of 22° C or more and greater than 5°C difference between mean summer and mean winter soil temperatures at a depth of 50 centimeters.

Igneous rock. Rock that was formed by cooling and solidification of magma and that has not been changed appreciably by weathering since its formation. Major varieties include plutonic and volcanic rock (e.g., andesite, basalt, and granite).

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Iron depletions. See Redoximorphic features.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements.

Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Isohyperthermic. A soil temperature regime that has mean annual soil temperatures of 22° C or more and less than 5°C difference between mean summer and mean winter soil temperatures at a depth of 50 centimeters.

Ksat. Saturated hydraulic conductivity. (See Permeability.)

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Linear extensibility. Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $\frac{1}{3}$ - or $\frac{1}{10}$ -bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Mass movement. A generic term for the dislodgment and downslope transport of soil and rock material as a unit under direct gravitational stress.

Masses. See Redoximorphic features.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement at depth in the earth's crust. Nearly all such rocks are crystalline.

Mine spoil. An accumulation of displaced earthy material, rock, or other waste material removed during mining or excavation. Also called earthy fill.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. A kind of map unit that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size.

Descriptive terms are as follows: abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Mountain. A generic term for an elevated area of the land surface, rising more than 1,000 feet (300 meters) above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can occur as a single, isolated mass or in a group forming a chain or range. Mountains are formed primarily by tectonic activity and/or volcanic action but can also be formed by differential erosion.

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Mudstone. A blocky or massive, fine grained sedimentary rock in which the proportions of clay and silt are approximately equal. Also, a general term for such material as clay, silt, claystone, siltstone, shale, and argillite and that should be used only when the amounts of clay and silt are not known or cannot be precisely identified.

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Naturalized pasture. Forestland that is used primarily for the production of forage for grazing by livestock rather than for the production of wood products. Overstory trees are removed or managed to promote the native and introduced understory vegetation. This vegetation is managed for its forage value through the use of grazing management principles.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. See Redoximorphic features.

Nose slope (geomorphology). A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent. Nose slopes consist dominantly of colluvium and slope-wash sediments (for example, slope alluvium).

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low.....	1.0 to 2.0 percent
Moderate.....	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high.....	more than 8.0 percent

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan*, *fragipan*, *claypan*, *plowpan*, and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The movement of water through the soil.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Impermeable.....	less than 0.0015 inch
Very slow	0.0015 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow.....	0.2 to 0.6 inch
Moderate.....	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid.....	more than 20 inches

Perudic. Pertaining to a soil moisture regime in which rainfall exceeds evapotranspiration throughout the year and where the soil never dries completely.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Pore linings. See Redoximorphic features.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed as pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid.....	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid.....	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline.....	7.4 to 7.8
Moderately alkaline.....	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline.....	9.1 and higher

Redoximorphic concentrations. See Redoximorphic features.

Redoximorphic depletions. See Redoximorphic features.

Redoximorphic features. Redoximorphic features are associated with wetness and result from alternating periods of reduction and oxidation of iron and manganese compounds in the soil. Reduction occurs during saturation with water, and oxidation occurs when the soil is not saturated. Characteristic color patterns are created by these processes. The reduced iron and manganese ions may be removed from a soil if vertical or lateral fluxes of water occur, in which case there is no iron or manganese precipitation in that soil. Wherever the iron and manganese are oxidized and precipitated, they form either soft masses or hard concretions or nodules. Movement of iron and manganese as a result of redoximorphic processes in a soil may result in redoximorphic features that are defined as follows:

1. Redoximorphic concentrations.—These are zones of apparent accumulation of iron-manganese oxides, including:
 - A. Nodules and concretions, which are cemented bodies that can be removed from the soil intact. Concretions are distinguished from nodules on the basis of internal organization. A concretion typically has concentric layers that are visible to the naked eye. Nodules do not have visible organized internal structure; *and*
 - B. Masses, which are noncemented concentrations of substances within the soil matrix; *and*
 - C. Pore linings, i.e., zones of accumulation along pores that may be either coatings on pore surfaces or impregnations from the matrix adjacent to the pores.
2. Redoximorphic depletions.—These are zones of low chroma (chromas less than those in the matrix) where either iron-manganese oxides alone or both iron-manganese oxides and clay have been stripped out, including:

- A. Iron depletions, i.e., zones that contain low amounts of iron and manganese oxides but have a clay content similar to that of the adjacent matrix; *and*
 - B. Clay depletions, i.e., zones that contain low amounts of iron, manganese, and clay (often referred to as silt coatings or skeletalans).
3. Reduced matrix.—This is a soil matrix that has low chroma *in situ* but undergoes a change in hue or chroma within 30 minutes after the soil material has been exposed to air.

Reduced matrix. See Redoximorphic features.

Regolith. All unconsolidated earth materials above the solid bedrock. It includes material weathered in place from all kinds of bedrock and alluvial, glacial, eolian, lacustrine, and pyroclastic deposits.

Relief. The relative difference in elevation between the upland summits and the lowlands or valleys of a given region.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as bedrock disintegrated in place.

Riser. The vertical or steep side slope (e.g., escarpment) of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural, steplike landforms, such as successive stream terraces.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saturated hydraulic conductivity (Ksat). See Permeability.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Sedimentary rock. A consolidated deposit of clastic particles, chemical precipitates, or organic remains accumulated at or near the surface of the earth under normal low temperature and pressure conditions. Sedimentary rocks include consolidated equivalents of alluvium, colluvium, drift, and eolian, lacustrine, and marine deposits. Examples are sandstone, siltstone, mudstone, claystone, shale, conglomerate, limestone, dolomite, and coal.

Series, soil. A group of soils that have profiles that are almost alike. All the soils of a given series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock that formed by the hardening of a deposit of clay, silty clay, or silty clay loam and that has a tendency to split into thin layers.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

- Shoulder.** The convex, erosional surface near the top of a hillslope. A shoulder is a transition from summit to backslope.
- Shrink-swell** (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.
- Side slope** (geomorphology). A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel. Side slopes are dominantly colluvium and slope-wash sediments.
- Silica.** A combination of silicon and oxygen. The mineral form is called quartz.
- Silt.** As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.
- Siltstone.** An indurated silt having the texture and composition of shale but lacking its fine lamination or fissility; a massive mudstone in which silt predominates over clay.
- Similar soils.** Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.
- Site index.** A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.
- Slickensides** (pedogenic). Grooved, striated, and/or glossy (shiny) slip faces on structural peds, such as wedges; produced by shrink-swell processes, most commonly in soils that have a high content of expansive clays.
- Slope.** The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey, classes for simple slopes are as follows:

Nearly level	0 to 2 percent
Gently sloping	2 to 5 percent
Strongly sloping	5 to 12 percent
Moderately steep	12 to 20 percent
Steep	20 to 40 percent
Very steep	40 to 60 percent
Strongly steep	60 to 90 percent

- Slope alluvium.** Sediment gradually transported down the slopes of mountains or hills primarily by nonchannel alluvial processes (i.e., slope-wash processes) and characterized by particle sorting. Lateral particle sorting is evident on long slopes. In a profile sequence, sediments may be distinguished by differences in size and/or specific gravity of rock fragments and may be separated by stone lines. Burnished peds and sorting of rounded or subrounded pebbles or cobbles distinguish these materials from unsorted colluvial deposits.
- Slow refill** (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.
- Sodic (alkali) soil.** A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.
- Sodicity.** The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^+ to $\text{Ca}^{++} + \text{Mg}^{++}$. The degrees of sodicity and their respective ratios are:

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Sodium adsorption ratio (SAR). A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief and by the passage of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay.....	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stone line. In a vertical cross section, a line formed by scattered fragments or a discrete layer of angular and subangular rock fragments (commonly a gravel- or cobble-sized lag concentration) that formerly was draped across a topographic surface and was later buried by additional sediments. A stone line generally caps material that was subject to weathering, soil formation, and erosion before burial. Many stone lines seem to be buried erosion pavements, originally formed by sheet and rill erosion across the land surface.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stream terrace. One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel, originally formed near the level of the stream; represents the remnants of an abandoned flood plain, stream bed, or valley floor produced during a former state of fluvial erosion or deposition.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice

common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Summit. The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the “plow layer,” or the “Ap horizon.”

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Terrace (conservation). An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geomorphology). A steplike surface, bordering a valley floor or shoreline, that represents the former position of a flood plain, lake, or seashore. The term is usually applied both to the relatively flat summit surface (tread) that was cut or built by stream or wave action and to the steeper descending slope (scarp or riser) that has graded to a lower base level of erosion.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying “coarse,” “fine,” or “very fine.”

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Tread. The flat to gently sloping, topmost, laterally extensive slope of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural steplike landforms, such as successive stream terraces.

Tuff. A generic term for any consolidated or cemented deposit that is 50 percent or more volcanic ash.

Upland. An informal, general term for the higher ground of a region, in contrast with a low-lying adjacent area, such as a valley or plain, or for land at a higher elevation than the flood plain or low stream terrace; land above the footslope zone of the hillslope continuum.

Ustic. Pertaining to a soil moisture regime in which moisture is limited but is present at a time when conditions are suitable for plant growth. In tropical and subtropical regions that have a monsoon climate with either one or two dry seasons, the moisture regime is ustic if there is at least one rainy season of 3 months or more.

Variation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of

water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Weathering. All physical disintegration, chemical decomposition, and biologically induced changes in rocks or other deposits at or near the earth's surface by atmospheric or biologic agents or by circulating surface waters but involving essentially no transport of the altered material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an oven-dry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The uprooting and tipping over of trees by the wind.

Tables

Soil Survey of San Germán Area, Puerto Rico

Table 1.--Monthly Climatic Data at Weather Stations of the National Oceanic and Atmospheric Administration

[Recorded in the period 1971 to 2000. Entries for temperature are in degrees Fahrenheit, entries for precipitation are in inches. The Lajas substation is NOAA station PR665097; lat. 18°01'59" N., long. 067°04'20" W.; elevation 90 feet. The Magueyes Island station is PR665693; lat. 17°58'13" N., long. 067°02'44" W.; elevation 2 feet. The Ensenada Ward station is PR663532; lat. 17°58'29" N., long. 066°56'48" W.; elevation 213 feet. The Maricao station is PR665908; lat. 18°09'04" N., long. 066°59'20" W.; elevation 2,832 feet. The San Francisco Sugar Mill station at Guayanilla is PR662316; lat. 17°59'00" N., long. 066°49'00" W.; elevation 30 feet. The San Francisco Sugar Mill station is slightly outside the survey area]

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
LAJAS SUBSTATION													
Minimum temperature----	60.6	61.1	62.1	64.5	67.8	69.3	68.9	68.9	68.9	68.8	66.1	62.5	65.8
Mean temperature----	73.7	73.9	74.7	76.4	78.6	80.1	80.2	81.1	79.9	79.3	77.5	75.0	77.5
Maximum temperature----	86.7	86.6	87.3	88.3	89.3	90.8	91.4	91.2	90.8	89.8	88.9	87.4	89.0
Monthly precipitation--	1.96	2.12	1.99	2.74	4.15	2.71	2.66	5.69	6.54	6.8	5.36	2.29	3.75
Annual precipitation--	---	---	---	---	---	---	---	---	---	---	---	---	45.01
MAGUEYES ISLAND													
Minimum temperature----	68.1	68.5	69.1	71.1	74.0	75.7	74.9	74.9	74.7	73.9	71.8	69.2	72.2
Mean temperature----	77.4	77.7	78.3	80.0	81.9	83.3	83.1	83.3	83.0	82.1	80.3	78.3	80.7
Maximum temperature----	86.7	86.8	87.4	88.8	89.8	90.8	91.2	91.7	91.3	90.2	88.8	87.4	89.2
Monthly precipitation--	1.31	1.15	1.2	1.46	2.86	1.49	1.66	3.5	4.93	5.16	4.23	1.28	2.52
Annual precipitation--	---	---	---	---	---	---	---	---	---	---	---	---	30.23
ENSENADA WARD AT GUÁNICA													
Monthly precipitation--	1.06	0.91	1.39	1.8	3.36	1.69	1.87	3.01	5.61	5.49	3.76	1.52	2.62
Annual precipitation--	---	---	---	---	---	---	---	---	---	---	---	---	31.47

Soil Survey of San Germán Area, Puerto Rico

Table 1.--Monthly Climatic Data at Weather Stations of the National Oceanic and Atmospheric Administration--Continued

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
MARICAO													
Minimum temperature----	61.5	61.1	61.1	62.2	64.3	65.8	66.0	66.6	66.2	66.0	64.8	62.5	64.0
Mean temperature----	69.1	69.2	69.7	70.7	72.2	74.0	73.8	74.3	73.8	73.2	72.0	69.6	71.8
Maximum temperature----	76.7	77.3	78.2	79.1	80.0	82.1	81.6	82	81.3	80.3	79.1	76.7	79.5
Monthly precipitation--	3.01	3.75	5.28	6.79	9.43	6.28	8.52	11.3	13.7	14.9	9.29	3.41	7.97
Annual precipitation--	---	---	---	---	---	---	---	---	---	---	---	---	95.6
SAN FRANCISCO SUGAR MILL AT GUAYANILLA													
Monthly precipitation--	1.09	0.97	1.2	1.82	3.27	1.79	1.74	3.08	5.1	5.48	3.79	0.95	2.52
Annual precipitation--	---	---	---	---	---	---	---	---	---	---	---	---	30.28

Soil Survey of San Germán Area, Puerto Rico

Table 2.--Air Temperature and Precipitation at Weather Stations of the National Oceanic and Atmospheric Administration

[Absence of an entry indicates that data were not available]

Station	Period of record	Lowest temp. on record	Highest temp. on record	Mean annual temp.	Mean summer temp.	Mean winter temp.	Mean annual precip.
		<i>°F</i>	<i>°F</i>	<i>°F</i>	<i>°F</i>	<i>°F</i>	<i>In</i>
Ensenada Ward, Guánica-----	1955 to 2007	---	---	---	---	---	31.47
Lajas Substation-	1948 to 2007	44	99	77.5	80.0	74.1	45.01
Magueyes Island, Lajas-----	1959 to 2007	40	100	80.7	82.9	77.7	30.23
Maricao 2SSW, San Germán-----	1969 to 2007	41	98	71.8	74.0	69.3	95.60
Puerto Real, Cabo Rojo-----	1955 to 2001	---	---	---	---	---	49.45
San Germán 4W----	1948 to 1973	49	98	77.2	79.6	74.4	57.43
Santa Rita, Guánica-----	1955 to 2007	---	---	---	---	---	33.62

Soil Survey of San Germán Area, Puerto Rico

Table 3.--Air Temperature and Precipitation at Weather Stations of the Soil Climate Analysis Network

[Data recorded in the period 2001 to 2007]

Station	Mean annual temp.	Mean summer temp.	Mean winter temp.	Mean annual precip.
	<i>°F</i>	<i>°F</i>	<i>°F</i>	<i>In</i>
Combate, Cabo Rojo----	78.8	81.5	75.8	24.61
Guánica State Forest at Bosque Seco-----	78.1	80.3	75.8	30.34
Guilarte State Forest at Adjuntas-----	66.2	68.7	63.3	84.79
Maricao State Forest at Monte del Estado, San Germán---	70.0	72.5	67.5	72.14

Soil Survey of San Germán Area, Puerto Rico

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
AbF	Agüeybaná clay, 12 to 60 percent slopes-----	3,327	1.5
AgD	Aguilita silty clay loam, 5 to 20 percent slopes-----	792	0.4
AgF	Aguilita silty clay loam, 20 to 60 percent slopes-----	156	*
AKA	Aguirre clay, occasionally ponded-----	4,281	1.9
AlF	Aljibe-Guamá-Indiera complex, 20 to 60 percent slopes-----	75	*
AtD	Altamira gravelly clay, 2 to 20 percent slopes-----	4,023	1.8
AtF	Altamira gravelly clay, 20 to 60 percent slopes-----	396	0.2
BaB	Bahía fine sand, 0 to 5 percent slopes-----	687	0.3
BhB	Bahía Salinas sand, 0 to 5 percent slopes, rarely flooded-----	532	0.2
BjA	Bajura clay, 0 to 1 percent slopes, frequently flooded-----	1,104	0.5
BkB	Beaches, sand, 0 to 5 percent slopes-----	127	*
BmC	Bermeja-Cerro Mariquita complex, 5 to 12 percent slopes-----	169	*
BmD	Bermeja-Cerro Mariquita complex, 12 to 20 percent slopes-----	271	0.1
BmF	Bermeja-Cerro Mariquita complex, 20 to 60 percent slopes-----	211	*
BrF	Bermeja-Rock outcrop complex, 20 to 60 percent slopes, extremely cobbly--	152	*
CaC	Cabo Rojo clay, 2 to 12 percent slopes-----	764	0.3
CbD	Caguabo clay loam, 12 to 20 percent slopes-----	154	*
ChF	Caguabo clay loam, 20 to 60 percent slopes-----	12,640	5.7
CeA	Cartagena clay, 0 to 2 percent slopes-----	3,239	1.5
CgD	Casabe clay, 5 to 20 percent slopes-----	416	0.2
CgF	Casabe clay, 20 to 60 percent slopes-----	175	*
ChA	Cataño sand, 0 to 2 percent slopes-----	224	0.1
CjD	Cerro Gordo mucky peat, 2 to 20 percent slopes-----	275	0.1
CkD	Cerro Mariquita gravelly clay loam, 12 to 20 percent slopes-----	447	0.2
CkF	Cerro Mariquita gravelly clay loam, 20 to 60 percent slopes-----	2,639	1.2
CmB	Coamo clay loam, 2 to 5 percent slopes-----	61	*
CoA	Coloso clay, 0 to 2 percent slopes, occasionally flooded-----	4,036	1.8
CsE	Consumo clay, 20 to 40 percent slopes-----	1,890	0.8
CsF	Consumo clay, 40 to 60 percent slopes-----	1,429	0.6
CtA	Cortada silty clay loam, 0 to 2 percent slopes, occasionally flooded-----	263	0.1
CuD	Costa-Pitahaya complex, 5 to 20 percent slopes-----	1,555	0.7
CuF	Costa-Pitahaya complex, 20 to 60 percent slopes-----	4,506	2.0
CvF	Cuchillas silty clay loam, 20 to 60 percent slopes-----	591	0.3
CvG	Cuchillas silty clay loam, 60 to 90 percent slopes-----	120	*
DeD	Delicias clay, 5 to 20 percent slopes-----	496	0.2
DqA	Dique loam, 0 to 2 percent slopes, frequently flooded-----	961	0.4
DsC	Descalabrado clay, 2 to 12 percent slopes-----	2,026	0.9
DsD	Descalabrado clay, 12 to 20 percent slopes-----	4,478	2.0
DsF	Descalabrado clay, 20 to 60 percent slopes-----	12,123	5.4
EcD	El Cacique-La Taína complex, 5 to 20 percent slopes-----	788	0.4
EcF	El Cacique-La Taína complex, 20 to 60 percent slopes-----	11,818	5.3
EcG	El Cacique-La Taína complex, 60 to 90 percent slopes-----	2,390	1.1
EdD	El Descanso-Hoconuco complex, 5 to 20 percent slopes-----	22	*
EdF	El Descanso-Hoconuco complex, 20 to 60 percent slopes-----	620	0.3
EdG	El Descanso-Hoconuco complex, 60 to 90 percent slopes-----	386	0.2
EpC	El Papayo gravelly clay loam, 2 to 12 percent slopes-----	1,049	0.5
EpD	El Papayo gravelly clay loam, 12 to 20 percent slopes-----	1,172	0.5
EpF	El Papayo gravelly clay loam, 20 to 60 percent slopes-----	1,027	0.5
FeA	Fé clay, 0 to 2 percent slopes-----	1,085	0.5
FrA	Fraternidad clay, 0 to 2 percent slopes-----	5,242	2.3
FrB	Fraternidad clay, 2 to 5 percent slopes-----	2,520	1.1
GbF	Guanábano clay, 20 to 60 percent slopes-----	392	0.2
GhC	Guanajibo gravelly sandy clay loam, 2 to 12 percent slopes-----	805	0.4
GnA	Guánica clay, 0 to 1 percent slopes-----	4,127	1.8
GuB	Guayabo fine sand, 0 to 5 percent slopes-----	306	0.1
GyB	Guayacán clay, 0 to 5 percent slopes-----	1,497	0.7
GyC	Guayacán clay, 5 to 12 percent slopes-----	1,115	0.5
GyD	Guayacán clay, 12 to 20 percent slopes-----	304	0.1
HmD	Humatas clay, 12 to 20 percent slopes-----	855	0.4
HmE	Humatas clay, 20 to 40 percent slopes-----	1,449	0.6
HmF	Humatas clay, 40 to 60 percent slopes-----	1,625	0.7

See footnote at end of table.

Soil Survey of San Germán Area, Puerto Rico

Table 4.--Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
JaB	Jácana clay, 0 to 5 percent slopes-----	1,440	0.6
JaC	Jácana clay, 5 to 12 percent slopes-----	1,578	0.7
JBA	Joyuda, Atolladero, and Bajura soils, very frequently flooded-----	626	0.3
LcE	La Covana-Limestone outcrop-Seboruco complex, 12 to 40 percent slopes----	2,247	1.0
LdA	La Luna silty clay loam, 0 to 2 percent slopes, occasionally flooded-----	977	0.4
LeF	La Tea-Limestone outcrop complex, 20 to 60 percent slopes-----	1,177	0.5
LfC	Landfill, 0 to 8 percent slopes-----	234	0.1
LkB	Lares clay, 0 to 5 percent slopes-----	651	0.3
LnA	Llanos Costa loam, 0 to 2 percent slopes-----	670	0.3
LnB	Llanos Costa loam, 2 to 5 percent slopes-----	893	0.4
LnC	Llanos Costa loam, 5 to 12 percent slopes-----	1,605	0.7
LpG	Los Peñones-Limestone outcrop complex, 60 to 90 percent slopes-----	204	*
MaB	Mabi clay, 2 to 5 percent slopes, rarely flooded-----	386	0.2
MbA	Maguayo very gravelly sandy clay loam, 0 to 2 percent slopes-----	340	0.2
MbC	Maguayo very gravelly sandy clay loam, 2 to 12 percent slopes-----	528	0.2
MCF	Malaya clay, 20 to 60 percent slopes-----	4,848	2.2
MDA	Manglillo, Boquerón, and Serrano soils, very frequently flooded-----	2,820	1.3
MeA	Maní clay, 0 to 2 percent slopes, occasionally flooded-----	676	0.3
MFF	Maresúa gravelly clay loam, 20 to 60 percent slopes-----	686	0.3
MgF	Maresúa-Serpentinite outcrop complex, 40 to 60 percent slopes-----	196	*
MiD	Mariana gravelly clay loam, 12 to 20 percent slopes-----	539	0.2
MiE	Mariana gravelly clay loam, 20 to 40 percent slopes-----	603	0.3
MKF	Maricao clay, 20 to 60 percent slopes-----	2,810	1.3
MKG	Maricao clay, 60 to 90 percent slopes-----	486	0.2
MnA	Melones clay, 0 to 2 percent slopes-----	121	*
MnC	Melones clay, 2 to 12 percent slopes-----	1,190	0.5
MoB	Montalva clay, 0 to 5 percent slopes-----	1,180	0.5
MoC	Montalva clay, 5 to 12 percent slopes-----	871	0.4
MqC	Monte grande clay, 2 to 12 percent slopes-----	2,145	1.0
MrD	Morado clay loam, 12 to 20 percent slopes-----	242	0.1
MrE	Morado clay loam, 20 to 40 percent slopes-----	750	0.3
MrF	Morado clay loam, 40 to 60 percent slopes-----	1,021	0.5
MuC	Múcara loam, 5 to 12 percent slopes-----	889	0.4
MuD	Múcara loam, 12 to 20 percent slopes-----	1,974	0.9
MuE	Múcara loam, 20 to 40 percent slopes-----	8,496	3.8
MuF	Múcara loam, 40 to 60 percent slopes-----	3,714	1.7
NpD	Nipe clay, 5 to 20 percent slopes-----	1,463	0.7
OrA	Olivares muck, ponded-----	350	0.2
PaA	Palmarejo loam, 0 to 2 percent slopes-----	204	*
PaB	Palmarejo loam, 2 to 5 percent slopes-----	611	0.3
PaC	Palmarejo loam, 5 to 12 percent slopes-----	198	*
PgA	Parguera clay, 0 to 2 percent slopes-----	367	0.2
PgB	Parguera clay, 2 to 5 percent slopes-----	316	0.1
PsF	Pitahaya-Limestone outcrop-Seboruco complex, 40 to 60 percent slopes-----	8,372	3.8
PsG	Pitahaya-Limestone outcrop-Seboruco complex, 60 to 90 percent slopes-----	434	0.2
Pt	Pits and Quarries-----	353	0.2
PzB	Pozo Blanco clay, 0 to 5 percent slopes-----	180	*
PzC	Pozo Blanco clay, 5 to 12 percent slopes-----	418	0.2
PzD	Pozo Blanco clay, 12 to 20 percent slopes-----	46	*
QbD	Quebrada clay loam, 12 to 20 percent slopes-----	312	0.1
QbE	Quebrada clay loam, 20 to 40 percent slopes-----	910	0.4
QbF	Quebrada clay loam, 40 to 60 percent slopes-----	3,593	1.6
ReA	Reilly sandy loam, 0 to 2 percent slopes, frequently flooded-----	1,398	0.6
RoD	Rosario silty clay, 12 to 20 percent slopes-----	310	0.1
RoE	Rosario silty clay, 20 to 40 percent slopes-----	385	0.2
RoF	Rosario silty clay, 40 to 60 percent slopes-----	1,100	0.5
RuF	Rubias-Chiquito complex, 40 to 60 percent slopes-----	2,231	1.0
RuG	Rubias-Chiquito complex, 60 to 90 percent slopes-----	24	*
Sa	Salt flats, ponded-----	1,283	0.6
Sb	Salt pits-----	304	0.1
ScA	San Antón clay loam, 0 to 2 percent slopes, occasionally flooded-----	2,760	1.2

See footnote at end of table.

Soil Survey of San Germán Area, Puerto Rico

Table 4.--Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
SdD	San Germán cobbly clay loam, 5 to 20 percent slopes-----	58	*
SdF	San Germán cobbly clay loam, 20 to 60 percent slopes-----	792	0.4
SgD	San Germán-Duey complex, 5 to 20 percent slopes-----	265	0.1
SgF	San Germán-Duey complex, 20 to 60 percent slopes-----	4,744	2.1
SiA	Santa Isabel clay, 0 to 2 percent slopes-----	502	0.2
SmE	Santa Marta gravelly clay loam, 20 to 40 percent slopes-----	310	0.1
SoC	Seboruco silty clay loam, 2 to 12 percent slopes-----	518	0.2
SsB	Sosa sandy loam, 2 to 5 percent slopes-----	1,649	0.7
SsC	Sosa sandy loam, 5 to 12 percent slopes-----	130	*
TeA	Teresa clay, 0 to 1 percent slopes-----	948	0.4
TfA	Teresa clay, ponded-----	188	*
ToA	Toa clay loam, 0 to 2 percent slopes, occasionally flooded-----	4,335	1.9
Ua	Urban land-----	15,314	6.9
UdB	Urban land-Bahía complex, 0 to 5 percent slopes-----	112	*
UgB	Urban land-Guayabo complex, 0 to 5 percent slopes-----	31	*
UsC	Urban land-Sosa complex, 5 to 12 percent slopes-----	61	*
VaA	Vayas silty clay, 0 to 2 percent slopes, occasionally flooded-----	677	0.3
VoC	Voladora clay, 5 to 12 percent slopes-----	659	0.3
VoD	Voladora clay, 12 to 20 percent slopes-----	237	0.1
W	Water-----	1,541	0.7
	Total-----	223,211	100.0

* Less than 0.1 percent.

Soil Survey of San Germán Area, Puerto Rico

Table 5.--Prime Farmland and Other Important Farmlands

[Only the soils considered prime or important farmland are listed. Urban or built-up areas of the soils listed are not considered prime or important farmland. If a soil is prime or important farmland only under certain conditions, the conditions are specified]

Map symbol	Map unit name	Farmland Classification
AKA	Aguirre clay, occasionally ponded	Prime farmland if irrigated and reclaimed of excess salts and sodium
BjA	Bajura clay, 0 to 1 percent slopes, frequently flooded	Farmland of statewide importance
CeA	Cartagena clay, 0 to 2 percent slopes	Prime farmland if irrigated
CmB	Coamo clay loam, 2 to 5 percent slopes	Prime farmland if irrigated
CoA	Coloso clay, 0 to 2 percent slopes, occasionally flooded	Prime farmland if drained
CsE	Consumo clay, 20 to 40 percent slopes	Farmland of unique importance
CtA	Cortada silty clay loam, 0 to 2 percent slopes, occasionally flooded	Prime farmland if irrigated
DqA	Dique loam, 0 to 2 percent slopes, frequently flooded	All areas are prime farmland
FrA	Fraternidad clay, 0 to 2 percent slopes	Prime farmland if irrigated
FrB	Fraternidad clay, 2 to 5 percent slopes	Prime farmland if irrigated
GhC	Guanajibo gravelly sandy clay loam, 2 to 12 percent slopes	Farmland of statewide importance
GnA	Guánica clay, 0 to 1 percent slopes	Prime farmland if irrigated and reclaimed of excess salts and sodium
GyB	Guayacán clay, 0 to 5 percent slopes	Prime farmland if irrigated
HmD	Humatas clay, 12 to 20 percent slopes	Farmland of unique importance
HmE	Humatas clay, 20 to 40 percent slopes	Farmland of unique importance
JaB	Jácana clay, 0 to 5 percent slopes	Farmland of statewide importance
JaC	Jácana clay, 5 to 12 percent slopes	Farmland of statewide importance
LdA	La Luna silty clay loam, 0 to 2 percent slopes, occasionally flooded	Prime farmland if irrigated
LkB	Lares clay, 0 to 5 percent slopes	All areas are prime farmland
LnA	Llanos Costa loam, 0 to 2 percent slopes	Prime farmland if irrigated
LnB	Llanos Costa loam, 2 to 5 percent slopes	Prime farmland if irrigated
LnC	Llanos Costa loam, 5 to 12 percent slopes	Prime farmland if irrigated
MaB	Mabi clay, 2 to 5 percent slopes, rarely flooded	All areas are prime farmland
MbA	Maguayo very gravelly sandy clay loam, 0 to 2 percent slopes	Prime farmland if irrigated
MbC	Maguayo very gravelly sandy clay loam, 2 to 12 percent slopes	Prime farmland if irrigated
MeA	Maní clay, 0 to 2 percent slopes, occasionally flooded	All areas are prime farmland
MiD	Mariana gravelly clay loam, 12 to 20 percent slopes	Farmland of unique importance
MiE	Mariana gravelly clay loam, 20 to 40 percent slopes	Farmland of unique importance
MnA	Melones clay, 0 to 2 percent slopes	Prime farmland if irrigated
MnC	Melones clay, 2 to 12 percent slopes	Prime farmland if irrigated
MoB	Montalva clay, 0 to 5 percent slopes	Prime farmland if irrigated
MoC	Montalva clay, 5 to 12 percent slopes	Prime farmland if irrigated
MqC	Monte grande clay, 2 to 12 percent slopes	All areas are prime farmland
MuC	Múcara loam, 5 to 12 percent slopes	Farmland of statewide importance
MuD	Múcara loam, 12 to 20 percent slopes	Farmland of statewide importance
OrA	Olivares muck, ponded	Prime farmland if drained
PaA	Palmarejo loam, 0 to 2 percent slopes	Prime farmland if irrigated
PaB	Palmarejo loam, 2 to 5 percent slopes	Prime farmland if irrigated
PaC	Palmarejo loam, 5 to 12 percent slopes	Prime farmland if irrigated
PgA	Parguera clay, 0 to 2 percent slopes	Prime farmland if irrigated
PgB	Parguera clay, 2 to 5 percent slopes	Prime farmland if irrigated
PzB	Pozo Blanco clay, 0 to 5 percent slopes	Prime farmland if irrigated
PzC	Pozo Blanco clay, 5 to 12 percent slopes	Prime farmland if irrigated
QbD	Quebrada clay loam, 12 to 20 percent slopes	Farmland of unique importance
SCA	San Antón clay loam, 0 to 2 percent slopes, occasionally flooded	Prime farmland if irrigated
SiA	Santa Isabel clay, 0 to 2 percent slopes	Farmland of statewide importance
ToA	Toa clay loam, 0 to 2 percent slopes, occasionally flooded	All areas are prime farmland
VaA	Vayas silty clay, 0 to 2 percent slopes, occasionally flooded	Prime farmland if drained
VoC	Voladora clay, 5 to 12 percent slopes	Farmland of statewide importance
VoD	Voladora clay, 12 to 20 percent slopes	Farmland of statewide importance

Soil Survey of San Germán Area, Puerto Rico

Table 6.--Land Capability Classification

Map symbol and soil name	Pct. of map unit	Capability class
AbF: Agüeybaná-----	85	6e
AgD: Aguilita-----	90	4e
AgF: Aguilita-----	80	6e
AkA: Aguirre-----	95	4w
AlF: Aljibe-----	40	7e
Guamá-----	30	6e
Indiera-----	25	7e
AtD: Altamira-----	85	4c
AtF: Altamira-----	85	6e
BaB: Bahía-----	90	3s
BhB: Bahía Salinas-----	90	7s
BjA: Bajura-----	90	3w
BkB: Beaches-----	100	8s
BmC: Bermeja-----	70	6s
Cerro Mariquita-----	20	6s
BmD: Bermeja-----	70	7s
Cerro Mariquita-----	20	6s
BmF: Bermeja-----	75	7s
Cerro Mariquita-----	20	7s
BrF: Bermeja-----	75	7s
Rock outcrop-----	15	8s
CaC: Cabo Rojo-----	90	3e
CbD: Caguabo-----	85	6s
CbF: Caguabo-----	85	7s
CeA: Cartagena-----	85	3c

Soil Survey of San Germán Area, Puerto Rico

Table 6.--Land Capability Classification
--Continued

Map symbol and soil name	Pct. of map unit	Capability class
CgD: Casabe-----	90	4s
CgF: Casabe-----	90	7e
ChA: Cataño-----	95	7s
CjD: Cerro Gordo-----	90	4s
CkD: Cerro Mariquita-----	80	6s
CkF: Cerro Mariquita-----	80	7s
CmB: Coamo-----	90	3c
CoA: Coloso-----	90	2w
CsE: Consumo-----	80	6e
CsF: Consumo-----	80	7e
CtA: Cortada-----	98	2c
CuD: Costa-----	67	6c
Pitahaya-----	25	6c
CuF: Costa-----	67	7c
Pitahaya-----	25	7c
CvF: Cuchillas-----	80	7e
CvG: Cuchillas-----	80	7e
DeD: Delicias-----	95	3e
DqA: Dique-----	90	3w
DsC: Descalabrado-----	90	4s
DsD: Descalabrado-----	90	4s
DsF: Descalabrado-----	90	7s

Soil Survey of San Germán Area, Puerto Rico

Table 6.--Land Capability Classification
--Continued

Map symbol and soil name	Pct. of map unit	Capability class
EcD:		
El Cacique-----	60	4s
La Taína-----	30	4s
EcF:		
El Cacique-----	60	6s
La Taína-----	30	6s
EcG:		
El Cacique-----	60	7e
La Taína-----	30	7e
Edd:		
El Descanso-----	50	4s
Hoconuco-----	45	4s
EdF:		
El Descanso-----	50	6s
Hoconuco-----	45	6s
EdG:		
El Descanso-----	50	7s
Hoconuco-----	45	7s
EpC:		
El Papayo-----	95	4s
EpD:		
El Papayo-----	95	6s
EpF:		
El Papayo-----	95	7s
FeA:		
Fé-----	95	4s
FrA:		
Fraternidad-----	90	2c
FrB:		
Fraternidad-----	90	2c
GbF:		
Guanábano-----	95	6e
GhC:		
Guanajibo-----	90	4e
GnA:		
Guánica-----	80	3w
GuB:		
Guayabo-----	90	3s
GyB:		
Guayacán-----	90	2c
GyC:		
Guayacán-----	90	3c
GyD:		
Guayacán-----	90	3c

Soil Survey of San Germán Area, Puerto Rico

Table 6.--Land Capability Classification
--Continued

Map symbol and soil name	Pct. of map unit	Capability class
HmD: Humatas-----	80	3e
HmE: Humatas-----	80	4e
HmF: Humatas-----	80	7e
JaB: Jácana-----	80	3c
JaC: Jácana-----	80	4c
JBA: Joyuda-----	50	8w
Atolladero-----	30	8w
Bajura-----	20	3w
LcE: La Covana-----	60	7s
Limestone outcrop----	20	8s
Seboruco-----	15	6e
LdA: La Luna-----	90	2c
LeF: La Tea-----	70	7e
LfC: Landfill-----	100	
LkB: Lares-----	80	2e
LnA: Llanos Costa-----	75	2c
LnB: Llanos Costa-----	75	2c
LnC: Llanos Costa-----	75	3c
LpG: Los Peñones-----	60	7s
Limestone outcrop----	40	8s
MaB: Mabí-----	70	2w
MbA: Maguayo-----	80	2c
MbC: Maguayo-----	80	3c
McF: Malaya-----	90	7s

Soil Survey of San Germán Area, Puerto Rico

Table 6.--Land Capability Classification
--Continued

Map symbol and soil name	Pct. of map unit	Capability class
MDA:		
Manglillo-----	50	8
Boquerón-----	30	7w
Serrano-----	20	7s
MeA:		
Maní-----	80	2w
MfF:		
Maresúa-----	80	7e
MgF:		
Maresúa-----	40	7e
Serpentine outcrop-	40	8s
MiD:		
Mariana-----	95	4e
MiE:		
Mariana-----	95	6e
MkF:		
Maricao-----	80	6e
MkG:		
Maricao-----	80	7e
MnA:		
Melones-----	95	2c
MnC:		
Melones-----	95	3c
MoB:		
Montalva-----	80	2c
MoC:		
Montalva-----	80	3c
MqC:		
Montegrando-----	90	3e
MrD:		
Morado-----	85	4e
MrE:		
Morado-----	85	6e
MrF:		
Morado-----	85	7e
MuC:		
Múcara-----	80	3e
MuD:		
Múcara-----	80	4e
MuE:		
Múcara-----	80	6e
MuF:		
Múcara-----	80	7e

Soil Survey of San Germán Area, Puerto Rico

Table 6.--Land Capability Classification
--Continued

Map symbol and soil name	Pct. of map unit	Capability class
NpD:		
Nipe-----	95	4e
OrA:		
Olivares-----	95	7w
PaA:		
Palmarejo-----	90	2c
PaB:		
Palmarejo-----	90	2c
PaC:		
Palmarejo-----	90	3c
PgA:		
Parguera-----	80	2c
PgB:		
Parguera-----	80	2c
PsF:		
Pitahaya-----	60	7s
Limestone outcrop----	20	8s
Seboruco-----	15	7e
PsG:		
Pitahaya-----	60	7e
Limestone outcrop----	20	8s
Seboruco-----	15	7e
Pt:		
Pits and quarries---	100	8
PzB:		
Pozo Blanco-----	95	2c
PzC:		
Pozo Blanco-----	95	3c
PzD:		
Pozo Blanco-----	95	3c
QbD:		
Quebrada-----	95	4e
QbE:		
Quebrada-----	95	6e
QbF:		
Quebrada-----	95	7e
ReA:		
Reilly-----	95	3w
RoD:		
Rosario-----	80	4s
RoE:		
Rosario-----	80	6e

Soil Survey of San Germán Area, Puerto Rico

Table 6.--Land Capability Classification
--Continued

Map symbol and soil name	Pct. of map unit	Capability class
RoF: Rosario-----	80	7e
RuF: Rubias-----	60	7e
Chiquito-----	30	7e
RuG: Rubias-----	60	7e
Chiquito-----	30	7e
Sa: Salt flats, ponded----	100	8
Sb: Salt pits-----	100	8
ScA: San Antón-----	95	2c
SdB: San Germán-----	95	6s
SdF: San Germán-----	95	7s
SgD: San Germán-----	60	6s
Duey-----	40	6s
SgF: San Germán-----	60	7s
Duey-----	40	7s
SiA: Santa Isabel-----	95	2c
SmE: Santa Marta-----	95	6e
SoC: Seboruco-----	90	4c
SsB: Sosa-----	90	3s
SsC: Sosa-----	90	3s
TeA: Teresa-----	95	4s
TfA: Teresa-----	95	6w
ToA: Toa-----	90	2w
Ua: Urban land-----	100	

Soil Survey of San Germán Area, Puerto Rico

**Table 6.--Land Capability Classification
--Continued**

Map symbol and soil name	Pct. of map unit	Capability class
UbB:		
Urban land-----	85	
Bahía-----	10	3s
UgB:		
Urban land-----	85	
Guayabo-----	10	3s
UsC:		
Urban land-----	80	
Sosa-----	15	3s
VaA:		
Vayas-----	90	2w
VoC:		
Voladora-----	90	3e
VoD:		
Voladora-----	90	4e
W:		
Water-----	100	

Soil Survey of San Germán Area, Puerto Rico

Table 7.--Selected Areas of Interest by Ecological Life Zone and Major Land Resource Area

Area of interest	Ecological life zone	Major Land Resource Area
Susúa State Forest-----	Moist Forest	Humid Mountains and Valleys (270)
Luchetti Lake Wildlife Refuge-	Moist Forest	Humid Mountains and Valleys (270)
Maricao State Forest-----	Wet Forest	Humid Mountains and Valleys (270)
Monte Guilarte State Forest---	Lower Montane Wet Forest	Humid Mountains and Valleys (270)
Punta Guaniquilla Reserve-----	Dry Forest	Semiarid Mountains and Valleys (271)
Sierra Bermeja-----	Dry Forest	Semiarid Mountains and Valleys (271)
Guánica Forest-----	Dry Forest	Semiarid Mountains and Valleys (271)
Joyuda Lagoon-----	Moist Forest	Humid Coastal Plain (272)
Belvedere Natural Reserve-----	Moist Forest	Humid Coastal Plains (272) and Humid Mountains and Valleys (270)
Boquerón Wildlife Refuge-----	Dry Forest	Semiarid Coastal Plains (273)
Cabo Rojo Salt Flat-----	Dry Forest	Semiarid Coastal Plains (273)
Cartagena Lagoon National Wildlife Refuge-----	Dry Forest	Semiarid Coastal Plains (273)
San Jacinto Salt flats-----	Dry Forest	Semiarid Coastal Plains (273)
Bahía Ballena Natural Reserve-	Dry Forest	Semiarid Coastal Plains (273)
Cabo Rojo National Refuge-----	Dry Forest	Semiarid Coastal Plains (273) and Semiarid Mountains and Valleys (271)
Boquerón State Forest-----	Dry Forest	Semiarid Coastal Plains (273) and Semiarid Mountains and Valleys (271)
La Parguera National Reserve--	Dry Forest	Semiarid Coastal Plains (273) and Semiarid Mountains and Valleys (271)

Table 8.--Common Plant Species

Technical name	Common name (English)	Common name (Spanish)	Growth habitat	Origin*	Ecosystem type
<i>Acasia farnesiana</i> -----	---	Aroma; Rayo	Tree	I	Dry forest
<i>Albizia lebbek</i> -----	Thibet tree	Acasia amarilla	Tree	I	Dry forest
<i>Albizia procera</i> -----	White siris	Acasia blanca	Tree	I	Dry forest
<i>Ananas comosus</i> -----	Pineapple	Piña cabeza	Forb	I	Dry forest
<i>Aristida adscensionis</i> -----	Sixweeks threeawn	Aristida de Asunción	Grass	N	Dry forest; coastal outcrops
<i>Aristida chaseae</i> -----	Chase's threeawn	---	Grass	N	Dry forest; Sosa
<i>Artocarpus altilis</i> -----	Breadfruit	Panapén	Tree	I	Moist forest
<i>Avicenia germinans</i> -----	Black mangrove	Mangle negro	Tree	N	Salt water wetlands
<i>Axonopus compressus</i> -----	Carpet grass	Gramma colorada	Grass	N	Moist and wet forests
<i>Azadiractha indica</i> -----	Neem	Margosa	Tree	I	Dry and moist forests
<i>Bacopa monnieri</i> -----	Coastal water-hyssop	Verba de culebra	Forb	I	Brakish wetlands
<i>Bothriochloa pertusa</i> -----	Hurricane	Huracán	Grass	I	Dry forest
<i>Bucida buceras</i> -----	Black olive	Úcar	Tree	N	Dry and moist forests
<i>Bursera simaruba</i> -----	Turpentine tree	Almácigo	Tree	I	Dry forest
<i>Byrsonyma lucida</i> -----	---	Palo de doncella	Tree	N	Dry forest
<i>Calotropis procera</i> -----	Giant milkweed	Algodón de seda	Shrub	I	Dry forest
<i>Cecropia peltata</i> -----	Trumpet tree	Yagrumo hembra	Tree	I	Moist and wet forests
<i>Cenchrus tribuloides</i> -----	Sandune sandbur	Abrojo de playa	Grass	N	Beach sands
<i>Cephalocereus royerii</i> -----	Royen's tree catus	Bucacán	Cacti	N	Dry forest
<i>Citrus spp.</i> -----	Citrus	Citricas	Tree	I	Moist forest
<i>Coffea arabica</i> -----	Coffee	Cafeto	Shrub	I	Moist and wet forests
<i>Comocladia dodonaea</i> -----	Cock's spur	Escambrón	Shrub	N	Dry and moist forests
<i>Croton discolor</i> -----	---	Lechecillo	Shrub	N	Dry forest
<i>Cyathea arborea</i> -----	Tree-fern	Helecho gigante	Shrub	N	Wet forest
<i>Cynodon nelsonii</i> -----	Star grass	Yerba estrella morada	Grass	I	Moist forest
<i>Dacryodes excelsa</i> -----	Candlewood	Tabonuco	Tree	N	Wet forest
<i>Delonix regia</i> -----	Flame tree	Flamboyán	Tree	I	Moist forest
<i>Dichanthium annulatum</i> -----	Kleberg's bluestem	Pajón	Grass	I	Dry forest
<i>Digitaria eriantha</i> -----	Pangola grass	Pangola	Grass	I	Moist forest
<i>Eichhornia crassipes</i> -----	Common water hyacinth	Jacinto de agua	Forb	I	Fresh water wetlands
<i>Erythrina poeppigiana</i> -----	Mountain immortal	Bucayo	Tree	I	Moist and wet forests
<i>Furcraea tuberosa</i> -----	Century plant	Maguey	Forb	I	Dry forest
<i>Guaiacum officinale</i> -----	Lignumvitae	Guayacán	Tree	N	Dry forest
<i>Heliotropium curassavicum</i> ---	Salt heliotrope	Cotorrera de playa	Forb	N	Coastal flats
<i>Inga laurina</i> -----	Sweet pea	Guamá	Tree	I	Moist forest
<i>Lantana camara</i> -----	---	Cariaquillo	Shrub	I	Dry forest
<i>Leucaena leucocephala</i> -----	Wild tamarind	Zarcilla	Shrub	I	Dry forest
<i>Ludwigia octovalvis</i> -----	Mexican primrosewillow	Cangá	Shrub	I	Fresh water wetlands
<i>Mailkara bidentata</i> -----	Bulletwood	Ausubo	Tree	N	Wet forest
<i>Mangifera indica</i> -----	Mango tree	Mangó	Tree	I	Moist forest
<i>Megathyrsus maximus</i>					
Syn. <i>Panicum maximum</i> -----	Guinea grass	Guinea	Grass	I	Dry and moist forests
<i>Melicoccus bijugatus</i> -----	Spanish lime	Quenepa	Tree	I	Dry forest
<i>Mimosa pellita</i> -----	Black mimosa	Morivivi gigante	Shrub	I	Wetlands in dry and moist forests
<i>Musa paradisiaca</i> -----	Plantain	Plátano	Forb	I	Moist forest

See footnote at end of table.

Table 8.--Common Plant Species--Continued

Technical name	Common name (English)	Common name (Spanish)	Growth habitat	Origin*	Ecosystem type
<i>Musa sapientum</i> -----	Banana	Guineo	Forb	I	Moist and wet forests
<i>Olyra latifolia</i> -----	Olyra	Carruzillo	Grass	N	Moist forest
<i>Opuntia dillenii</i> -----	Prickly pear	Tuna brava	Forb	N	Sandy beaches; rock outcrops
<i>Paspalidium geminatum</i> -----	Water panicum	Yerba de pantano	Grass	N	Fresh water wetlands
<i>Paspalum fasciculatum</i> -----	Mexican crown grass	Yerba venezolana	Grass	I	Moist soils in dry and moist forests
<i>Paspalum millegrana</i> -----	Crown grass	Cortadera	Grass	N	Moist soils in dry and moist forests
<i>Paspalum paniculatum</i> -----	Crown grass	Peluda	Grass	N	Moist forest
<i>Paspalum virgatum</i> -----	Talquezal	Matojo blanco	Grass	N	Moist forest
<i>Pennisetum ciliare</i> -----	Buffel	Bofel	Grass	I	Dry forest; uplands
<i>Pharus latifolius</i> -----	Broadleaf stalkgrass	Lamedora	Grass	N	Moist forest
<i>Pictetia aculeata</i> -----	Fustic	Tachuelo	Tree	N	Dry forest; uplands
<i>Pistia stratiotes</i> -----	Water lettuce	Lechuga de agua	Forb	I	Fresh water wetlands in dry and moist forests
<i>Polygala cowellii</i> -----	Violet	Violeta	Tree	N	Dry forest; uplands
<i>Polygonum punctatum</i> -----	Smartweed	Yerba de jicotea	Forb	I	Fresh water wetlands in dry and moist forests
<i>Prosopis juliflora</i> -----	Mesquite	Bayahonda	Tree	I	Dry forest
<i>Rizophora mangle</i> -----	Red mangrove	Mangle rojo	Tree/shrub	N	Marine coast and estuaries
<i>Roystonea borinquena</i> -----	Puertorican royal palm	Palma real	Tree	N	Moist forest
<i>Sesbania sesban</i> -----	Sesbania	Papagayo	Short-lived shrub	I	Fresh water wetlands in dry and moist forests
<i>Sloanea berteriana</i> -----	---	Motillo	Tree	N	Wet forest
<i>Spartina patens</i> -----	Saltgrass; Spartina	Yerba de sal	Grass	I	Sand and rocky beaches in dry and moist forests
<i>Spatodea campanulata</i> -----	African tulip tree	Tulipán africano	Tree	I	Moist and wet forests
<i>Tabebuia heterophylla</i> -----	White cedar	Roble blanco	Tree	N	Moist forest
<i>Tamarindus indica</i> -----	Tamarind	Tamarindo	Tree	I	Dry forest
<i>Typha dominguensis</i> -----	Thypa	Enea	Grasslike	I	Fresh and brackish water wetlands
<i>Zanthophyllum monophyllum</i> ---	---	Espino rubial	Tree	N	Dry forest

* I stands for introduced; N stands for native.

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Table 9.--Vegetation Related to Soil Conditions

Scientific name	Common name (English)	Common name (Spanish)	Higher frequency conditions
<i>Ananas comosus</i> -----	Pineapple	Piña cabezona	Mariana soil series
<i>Aristida adscensionis</i> ----	Sixweeks threeawn	Aristida de Asunción	Coastal rock outcrop
<i>Axonopus compressus</i> -----	Carpet grass	Pasto alfombra, grama colorada	Moist lowlands
<i>Bouteloua heterostega</i> -----	Slender grama	Lamilla	Serpentine and calcareous substratum
<i>Bursera simaruba</i> -----	Turpentine tree	Almácigo	Calcareous substratum
<i>Clusia rosea</i> -----	Pitch tree	Cupey	Serpentine; calcareous
<i>Heliotropium curassavicum</i> -	Salt heliotrope	Cotorrera de playa	Coastal hypersaline hydric soils
<i>Heteropogon contortus</i> -----	Twisted grass	Yerba torcida	Shallow calcareous substratum
<i>Melocactus intortus</i> -----	Turk's cap	Melón de costa	Limestone outcrops; soils that are shallow to rock in dry coastal areas
<i>Spartina patens</i> -----	Salt grass; Spartina	Spartina	Coastal sands
<i>Sporobolus pyramidatus</i> ----	Salt grass	Yerba de sal	Coastal hypersaline hydric soils

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Table 10.--Species with Conservation Priority

Status	Amphibians	Birds	Reptiles	Invertebrates	Plants	Total
Critically endangered--	0	5	0	2	8	15
Endangered-----	1	4	1	0	6	12
Vulnerable-----	1	3	2	0	2	8
Total-----	2	12	3	2	16	35

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Table 11.--Listed Species and Level of Endangerment

Taxon	Name			Status*	
	Scientific	English	Spanish	S	F
Amphibians	<i>Eleutherodactylus portoricensis</i>	Puerto Rican coquí	Coquí de la montaña	VU	
	<i>Peltophryne lemur</i>	Puerto Rican crested toad	Sapo concho de PR	EN	T
Birds	<i>Accipiter striatus venator</i>	Sharp shinned hawk	Halcón de Sierra	CR	
	<i>Charadrius alexandrinus</i>	Snowy plover	Playero Blanco	CR	
	<i>Charadrius melodus</i>	Piping plover	Playero Melódico	CR	T
	<i>Dendrocygna arborea</i>	West Indian whistling duck	Yaguaza	CR	
	<i>Falco peregrinus tundrius</i>	Peregrine falcon	Falcón Pelegrino	CR	
	<i>Agelaius xanthomus</i>	Yellow-shouldered blackbird	Mariquita de Puerto Rico	EN	E
	<i>Caprimulgus noctitherus</i>	Puerto Rican nightjar	Guabairo pequeño	EN	E
	<i>Nomonyx dominicus</i>	Masked duck	Pato Dominicó	EN	
	<i>Pelecanus occidentalis</i>	Brown pelican	Pelicano Pardo	EN	E
	<i>Fulica caribaea</i>	Caribbean coot	Gallinazao Antillano	VU	
	<i>Oxyura jamaicensis</i>	Ruddy duck	Pato Chorizo	VU	
	<i>Sterna dougallii</i>	Roseate tern	Palometa	VU	T
Plants	<i>Aristida chaseae</i>	Chase's threeawn		EN	E
	<i>Aristida portoricensis</i>	---	Pelos del Diablo	CR	E
	<i>Catesbaea melanocarpa</i>	---	---	EN	E
	<i>Cordia alliodora</i>	Puerto Rico manjack	---	EN	E
	<i>Cranichis ricartii</i>	Orquid	Orquídea	EN	E
	<i>Crescentia portoricensis</i>	---	Higüero de Sierra	CR	E
	<i>Eugenia woodburyana</i>	Woodbury's stopper	---	CR	E
	<i>Gesneria pauciflora</i>	---	---	VU	T
	<i>Lyonia truncata</i> var. <i>proctori</i>	---	---	CR	E
	<i>Mitracarpus maxwelliae</i>	---	---	EN	E
	<i>Mitracarpus polycladus</i>	---	---	EN	E
	<i>Ottoschulzia rhodoxylon</i>	---	Palo de Rosa	CR	E
	<i>Stahlia monosperma</i>	---	Cobana negra	VU	T
	<i>Thelypteris yaucoensis</i>	---	---	CR	E
	<i>Trichilia triacantha</i>	---	Bariaco	CR	E
	<i>Vernonia proctori</i>	---	---	CR	E
Reptiles	<i>Anolis cooki</i>	Cook lizard	Lagartijo del bosque seco	EN	
	<i>Epicrates inornatus</i>	Puerto Rican boa	Boa de Puerto Rico	VU	E
	<i>Mabuya mabouya sloanei</i>	Slippery back skink	Lucía	VU	

* S--State; F--Federal; CR--Critically Endangered; EN--Endangered; VU--Vulnerable; T--Threatened; and E--Endangered.

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Table 12a.--Recreational Development (Part 1)

[The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table]

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AbF: Agüeybaná-----	85	Very limited Slope Too clayey Slow water movement	1.00 1.00 0.99	Very limited Slope Too clayey Slow water movement	1.00 1.00 0.99	Very limited Slope Too clayey Slow water movement	1.00 1.00 0.99
AgD: Aguilita-----	90	Very limited Sodium content Slope Gravel content	1.00 0.84 0.46	Very limited Sodium content Slope Gravel content	1.00 0.84 0.46	Very limited Slope Gravel content Sodium content	1.00 1.00 1.00
AgF: Aguilita-----	80	Very limited Slope Sodium content Gravel content	1.00 1.00 0.46	Very limited Slope Sodium content Gravel content	1.00 1.00 0.46	Very limited Slope Gravel content Sodium content	1.00 1.00 1.00
AkA: Aguirre-----	95	Very limited Ponding Too clayey Slow water movement	1.00 0.50 0.45	Very limited Ponding Too clayey Slow water movement	1.00 0.50 0.45	Very limited Ponding Too clayey Slow water movement	1.00 0.50 0.45
AlF: Aljibe-----	40	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Depth to bedrock	1.00 0.10
Guamá-----	30	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00
Indiera-----	25	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00
AtD: Altamira-----	85	Very limited Too clayey Slow water movement Gravel content Slope	1.00 0.99 0.38 0.01	Very limited Too clayey Slow water movement Gravel content Slope	1.00 0.99 0.38 0.01	Very limited Gravel content Slope Too clayey Slow water movement	1.00 1.00 1.00 0.99
AtF: Altamira-----	85	Very limited Slope Too clayey Slow water movement Gravel content	1.00 1.00 0.99 0.38	Very limited Slope Too clayey Slow water movement Gravel content	1.00 1.00 0.99 0.38	Very limited Slope Gravel content Too clayey Slow water movement	1.00 1.00 1.00 0.99

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Table 12a.--Recreational Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BaB: Bahía-----	90	Very limited Too sandy	1.00	Very limited Too sandy	1.00	Very limited Too sandy Slope	1.00 0.12
BhB: Bahía Salinas-----	90	Very limited Salinity Too sandy	1.00 1.00	Very limited Too sandy Salinity	1.00 1.00	Very limited Too sandy Salinity Gravel content	1.00 1.00 0.17
BjA: Bajura-----	90	Very limited Depth to saturated zone Flooding Slow water movement Too clayey	1.00 1.00 1.00 1.00	Very limited Depth to saturated zone Slow water movement Too clayey Flooding	1.00 1.00 1.00 0.40	Very limited Slow water movement Depth to saturated zone Flooding Too clayey	1.00 1.00 1.00 1.00
BkB: Beaches-----	100	Not rated		Not rated		Not rated	
BmC: Bermeja-----	70	Very limited Depth to bedrock Large stones content Too sandy Slope	1.00 0.86 0.09 0.01	Very limited Depth to bedrock Large stones content Too sandy Slope	1.00 0.86 0.09 0.01	Very limited Depth to bedrock Slope Large stones content Gravel content Too sandy	1.00 1.00 0.86 0.82 0.09
Cerro Mariquita-----	20	Very limited Depth to bedrock Gravel content Slope	1.00 0.63 0.01	Very limited Depth to bedrock Gravel content Slope	1.00 0.63 0.01	Very limited Gravel content Depth to bedrock Slope	1.00 1.00 1.00
BmD: Bermeja-----	70	Very limited Slope Depth to bedrock Large stones content Too sandy	1.00 1.00 0.86 0.09	Very limited Slope Depth to bedrock Large stones content Too sandy	1.00 1.00 0.86 0.09	Very limited Slope Depth to bedrock Large stones content Gravel content Too sandy	1.00 1.00 0.86 0.82 0.09
Cerro Mariquita-----	20	Very limited Depth to bedrock Slope Gravel content	1.00 1.00 0.63	Very limited Depth to bedrock Slope Gravel content	1.00 1.00 0.63	Very limited Gravel content Slope Depth to bedrock	1.00 1.00 1.00
BmF: Bermeja-----	75	Very limited Slope Depth to bedrock Large stones content Too sandy	1.00 1.00 0.86 0.09	Very limited Slope Depth to bedrock Large stones content Too sandy	1.00 1.00 0.86 0.09	Very limited Slope Depth to bedrock Large stones content Gravel content Too sandy	1.00 1.00 0.86 0.82 0.09

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Table 12a.--Recreational Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BmF: Cerro Mariquita-----	20	Very limited Slope Depth to bedrock Gravel content	1.00 1.00 0.63	Very limited Slope Depth to bedrock Gravel content	1.00 1.00 0.63	Very limited Gravel content Slope Depth to bedrock	1.00 1.00 1.00
BrF: Bermeja-----	75	Very limited Slope Depth to bedrock Large stones content Too sandy	1.00 1.00 0.86 0.09	Very limited Slope Depth to bedrock Large stones content Too sandy	1.00 1.00 0.86 0.09	Very limited Slope Depth to bedrock Large stones content Gravel content Too sandy	1.00 1.00 0.86 0.82 0.09
Rock outcrop-----	15	Not rated		Not rated		Not rated	
CaC: Cabo Rojo-----	90	Very limited Slow water movement	1.00	Very limited Slow water movement	1.00	Very limited Slow water movement Slope	1.00 1.00
CbD: Caguabo-----	85	Very limited Slope Depth to bedrock Slow water movement Gravel content	1.00 1.00 0.99 0.88	Very limited Slope Depth to bedrock Slow water movement Gravel content	1.00 1.00 0.99 0.88	Very limited Slope Depth to bedrock Gravel content Slow water movement	1.00 1.00 1.00 0.99
CbF: Caguabo-----	85	Very limited Slope Depth to bedrock Slow water movement Gravel content	1.00 1.00 0.99 0.88	Very limited Slope Depth to bedrock Slow water movement Gravel content	1.00 1.00 0.99 0.88	Very limited Slope Depth to bedrock Gravel content Slow water movement	1.00 1.00 1.00 0.99
CeA: Cartagena-----	85	Very limited Sodium content Ponding Salinity Too clayey Slow water movement	1.00 1.00 0.50 0.50 0.45	Very limited Sodium content Ponding Salinity Too clayey Slow water movement	1.00 1.00 0.50 0.50 0.45	Very limited Sodium content Ponding Salinity Too clayey Slow water movement	1.00 1.00 0.50 0.50 0.45
CgD: Casabe-----	90	Very limited Depth to bedrock Slope Too clayey Slow water movement	1.00 1.00 0.50 0.45	Very limited Depth to bedrock Slope Too clayey Slow water movement	1.00 1.00 0.50 0.45	Very limited Depth to bedrock Slope Gravel content Too clayey Slow water movement	1.00 1.00 0.92 0.50 0.45

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Table 12a.--Recreational Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CgF: Casabe-----	90	Very limited Slope Depth to bedrock Too clayey Slow water movement	1.00 1.00 0.50 0.45	Very limited Slope Depth to bedrock Too clayey Slow water movement	1.00 1.00 0.50 0.45	Very limited Slope Depth to bedrock Gravel content Too clayey Slow water movement	1.00 1.00 0.92 0.50 0.45
ChA: Cataño-----	95	Very limited Too sandy	1.00	Very limited Too sandy	1.00	Very limited Too sandy	1.00
CjD: Cerro Gordo-----	90	Somewhat limited Slope	0.63	Somewhat limited Slope	0.63	Very limited Slope	1.00
CkD: Cerro Mariquita----	80	Very limited Depth to bedrock Slope Gravel content	1.00 1.00 0.63	Very limited Depth to bedrock Slope Gravel content	1.00 1.00 0.63	Very limited Gravel content Slope Depth to bedrock	1.00 1.00 1.00
CkF: Cerro Mariquita----	80	Very limited Slope Depth to bedrock Gravel content	1.00 1.00 0.63	Very limited Slope Depth to bedrock Gravel content	1.00 1.00 0.63	Very limited Gravel content Slope Depth to bedrock	1.00 1.00 1.00
CmB: Coamo-----	90	Somewhat limited Slope	0.04	Somewhat limited Slope	0.04	Very limited Slope	1.00
CoA: Coloso-----	90	Very limited Flooding Too clayey Slow water movement Depth to saturated zone	1.00 1.00 0.96 0.39	Very limited Too clayey Slow water movement Depth to saturated zone	1.00 0.96 0.19	Very limited Too clayey Slow water movement Flooding Depth to saturated zone	1.00 0.96 0.60 0.39
CsE: Consumo-----	80	Very limited Slope Slow water movement	1.00 0.99	Very limited Slope Slow water movement	1.00 0.99	Very limited Slope Slow water movement	1.00 0.99
CsF: Consumo-----	80	Very limited Slope Slow water movement	1.00 0.99	Very limited Slope Slow water movement	1.00 0.99	Very limited Slope Slow water movement	1.00 0.99
CtA: Cortada-----	98	Very limited Flooding	1.00	Not limited		Somewhat limited Flooding	0.60

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Table 12a.--Recreational Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CuD:							
Costa-----	67	Very limited Slope Depth to bedrock Gravel content Too clayey Slow water movement	1.00 1.00 0.55 0.50 0.45	Very limited Slope Depth to bedrock Gravel content Too clayey Slow water movement	1.00 1.00 0.55 0.50 0.45	Very limited Gravel content Depth to bedrock Slope Too clayey Slow water movement	1.00 1.00 1.00 0.50 0.45
Pitahaya-----	25	Very limited Depth to bedrock Too clayey Slow water movement	1.00 0.50 0.45	Very limited Depth to bedrock Too clayey Slow water movement	1.00 0.50 0.45	Very limited Depth to bedrock Slope Gravel content Too clayey Slow water movement	1.00 0.88 0.64 0.50 0.45
CuF:							
Costa-----	67	Very limited Slope Depth to bedrock Gravel content Too clayey Slow water movement	1.00 1.00 0.55 0.50 0.45	Very limited Slope Depth to bedrock Gravel content Too clayey Slow water movement	1.00 1.00 0.55 0.50 0.45	Very limited Gravel content Slope Depth to bedrock Too clayey Slow water movement	1.00 1.00 1.00 0.50 0.45
Pitahaya-----	25	Very limited Slope Depth to bedrock Too clayey Slow water movement	1.00 1.00 0.50 0.45	Very limited Slope Depth to bedrock Too clayey Slow water movement	1.00 1.00 0.50 0.45	Very limited Slope Depth to bedrock Gravel content Too clayey Slow water movement	1.00 1.00 0.64 0.50 0.45
CvF:							
Cuchillas-----	80	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock Gravel content	1.00 1.00 0.08
CvG:							
Cuchillas-----	80	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock Gravel content	1.00 1.00 0.08
DeD:							
Delicias-----	95	Somewhat limited Slope Too clayey	0.84 0.50	Somewhat limited Slope Too clayey	0.84 0.50	Very limited Slope Gravel content Too clayey	1.00 0.99 0.50
DqA:							
Dique-----	90	Very limited Flooding	1.00	Somewhat limited Flooding	0.40	Very limited Flooding	1.00

Soil Survey of San Germán Area, Puerto Rico

Table 12a.--Recreational Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
DsC: Descalabrado-----	90	Very limited Depth to bedrock Too clayey Slow water movement Gravel content	1.00 0.50 0.45 0.01	Very limited Depth to bedrock Too clayey Slow water movement Gravel content	1.00 0.50 0.45 0.01	Very limited Depth to bedrock Gravel content Slope Too clayey Slow water movement	1.00 1.00 1.00 0.50 0.45
DsD: Descalabrado-----	90	Very limited Depth to bedrock Slope Too clayey Slow water movement Gravel content	1.00 1.00 0.50 0.45 0.01	Very limited Depth to bedrock Slope Too clayey Slow water movement Gravel content	1.00 1.00 0.50 0.45 0.01	Very limited Slope Depth to bedrock Gravel content Too clayey Slow water movement	1.00 1.00 1.00 0.50 0.45
DsF: Descalabrado-----	90	Very limited Slope Depth to bedrock Too clayey Slow water movement Gravel content	1.00 1.00 0.50 0.45 0.01	Very limited Slope Depth to bedrock Too clayey Slow water movement Gravel content	1.00 1.00 0.50 0.45 0.01	Very limited Slope Depth to bedrock Gravel content Too clayey Slow water movement	1.00 1.00 1.00 0.50 0.45
EcD: El Cacique-----	60	Very limited Depth to bedrock Slow water movement Slope	1.00 0.99 0.84	Very limited Depth to bedrock Slow water movement Slope	1.00 0.99 0.84	Very limited Depth to bedrock Slope Slow water movement	1.00 1.00 0.99
La Taína-----	30	Very limited Gravel content Depth to bedrock Too clayey Slow water movement Slope	1.00 1.00 1.00 0.99 0.84	Very limited Too clayey Gravel content Depth to bedrock Slow water movement Slope	1.00 1.00 1.00 0.99 0.84	Very limited Depth to bedrock Slope Gravel content Too clayey Slow water movement	1.00 1.00 1.00 1.00 0.99
EcF: El Cacique-----	60	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 0.99	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 0.99	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 0.99
La Taína-----	30	Very limited Slope Gravel content Depth to bedrock Too clayey Slow water movement	1.00 1.00 1.00 1.00 0.99	Very limited Slope Too clayey Gravel content Depth to bedrock Slow water movement	1.00 1.00 1.00 1.00 0.99	Very limited Slope Depth to bedrock Gravel content Too clayey Slow water movement	1.00 1.00 1.00 1.00 0.99

Soil Survey of San Germán Area, Puerto Rico

Table 12a.--Recreational Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
EcG:							
El Cacique-----	60	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 0.99	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 0.99	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 0.99
La Taína-----	30	Very limited Slope Gravel content Depth to bedrock Too clayey Slow water movement	1.00 1.00 1.00 1.00 0.99	Very limited Slope Too clayey Gravel content Depth to bedrock Slow water movement	1.00 1.00 1.00 1.00 0.99	Very limited Slope Depth to bedrock Gravel content Too clayey Slow water movement	1.00 1.00 1.00 1.00 0.99
Edd:							
El Descanso-----	50	Very limited Depth to bedrock Slope	1.00 0.84	Very limited Depth to bedrock Slope	1.00 0.84	Very limited Depth to bedrock Slope	1.00 1.00
Hoconuco-----	45	Very limited Depth to bedrock Slow water movement Slope Large stones content	1.00 0.99 0.84 0.10	Very limited Depth to bedrock Slow water movement Slope Large stones content	1.00 0.99 0.84 0.10	Very limited Slope Depth to bedrock Slow water movement Large stones content	1.00 1.00 0.99 0.10
EdF:							
El Descanso-----	50	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00
Hoconuco-----	45	Very limited Slope Depth to bedrock Slow water movement Large stones content	1.00 1.00 0.99 0.10	Very limited Slope Depth to bedrock Slow water movement Large stones content	1.00 1.00 0.99 0.10	Very limited Slope Depth to bedrock Slow water movement Large stones content	1.00 1.00 0.99 0.10
EdG:							
El Descanso-----	50	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00
Hoconuco-----	45	Very limited Slope Depth to bedrock Slow water movement Large stones content	1.00 1.00 0.99 0.10	Very limited Slope Depth to bedrock Slow water movement Large stones content	1.00 1.00 0.99 0.10	Very limited Slope Depth to bedrock Slow water movement Large stones content	1.00 1.00 0.99 0.10
EpC:							
El Papayo-----	95	Very limited Depth to bedrock Slow water movement Gravel content	1.00 0.99 0.61	Very limited Depth to bedrock Slow water movement Gravel content	1.00 0.99 0.61	Very limited Depth to bedrock Gravel content Slope Slow water movement	1.00 1.00 1.00 0.99

Soil Survey of San Germán Area, Puerto Rico

Table 12a.--Recreational Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
EpD: El Papayo-----	95	Very limited Depth to bedrock Slope Slow water movement Gravel content	1.00 1.00 0.99 0.61	Very limited Depth to bedrock Slope Slow water movement Gravel content	1.00 1.00 0.99 0.61	Very limited Slope Depth to bedrock Gravel content Slow water movement	1.00 1.00 1.00 0.99
EpF: El Papayo-----	95	Very limited Slope Depth to bedrock Slow water movement Gravel content	1.00 1.00 0.99 0.61	Very limited Slope Depth to bedrock Slow water movement Gravel content	1.00 1.00 0.99 0.61	Very limited Slope Depth to bedrock Gravel content Slow water movement	1.00 1.00 1.00 0.99
FeA: Fé-----	95	Very limited Sodium content Salinity Too clayey Slow water movement	1.00 0.50 0.50 0.45	Very limited Sodium content Salinity Too clayey Slow water movement	1.00 0.50 0.50 0.45	Very limited Sodium content Salinity Too clayey Slow water movement	1.00 0.50 0.50 0.45
FrA: Fraternidad-----	90	Somewhat limited Too clayey Slow water movement	0.50 0.45	Somewhat limited Too clayey Slow water movement	0.50 0.45	Somewhat limited Too clayey Slow water movement	0.50 0.45
FrB: Fraternidad-----	90	Somewhat limited Too clayey Slow water movement	0.50 0.45	Somewhat limited Too clayey Slow water movement	0.50 0.45	Somewhat limited Too clayey Slow water movement Slope	0.50 0.45 0.12
GbF: Guanábano-----	95	Very limited Slope Too clayey Slow water movement	1.00 0.50 0.45	Very limited Slope Too clayey Slow water movement	1.00 0.50 0.45	Very limited Slope Too clayey Slow water movement Gravel content	1.00 0.50 0.45 0.01
GhC: Guanajibo-----	90	Somewhat limited Slow water movement	0.96	Somewhat limited Slow water movement	0.96	Very limited Slope Slow water movement Gravel content	1.00 0.96 0.86
GnA: Guánica-----	80	Very limited Sodium content Ponding Too clayey Slow water movement	1.00 1.00 1.00 1.00	Very limited Too clayey Ponding Slow water movement Sodium content	1.00 1.00 1.00 1.00	Very limited Slow water movement Too clayey Sodium content Ponding	1.00 1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 12a.--Recreational Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GuB: Guayabo-----	90	Very limited Too sandy	1.00	Very limited Too sandy	1.00	Very limited Too sandy Slope	1.00 0.12
GyB: Guayacán-----	90	Very limited Too clayey Slow water movement	1.00 0.99	Very limited Too clayey Slow water movement	1.00 0.99	Very limited Too clayey Slow water movement	1.00 0.99
GyC: Guayacán-----	90	Very limited Too clayey Slow water movement Slope	1.00 0.99 0.04	Very limited Too clayey Slow water movement Slope	1.00 0.99 0.04	Very limited Slope Too clayey Slow water movement	1.00 1.00 0.99
GyD: Guayacán-----	90	Very limited Slope Too clayey Slow water movement	1.00 1.00 0.99	Very limited Slope Too clayey Slow water movement	1.00 1.00 0.99	Very limited Slope Too clayey Slow water movement	1.00 1.00 0.99
HmD: Humatas-----	80	Very limited Slope Too clayey Slow water movement	1.00 1.00 0.99	Very limited Slope Too clayey Slow water movement	1.00 1.00 0.99	Very limited Slope Too clayey Slow water movement	1.00 1.00 0.99
HmE: Humatas-----	80	Very limited Slope Too clayey Slow water movement	1.00 1.00 0.99	Very limited Slope Too clayey Slow water movement	1.00 1.00 0.99	Very limited Slope Too clayey Slow water movement	1.00 1.00 0.99
HmF: Humatas-----	80	Very limited Slope Too clayey Slow water movement	1.00 1.00 0.99	Very limited Slope Too clayey Slow water movement	1.00 1.00 0.99	Very limited Slope Too clayey Slow water movement	1.00 1.00 0.99
JaB: Jácana-----	80	Somewhat limited Too clayey Slow water movement	0.50 0.45	Somewhat limited Too clayey Slow water movement	0.50 0.45	Somewhat limited Slope Too clayey Slow water movement Depth to bedrock	0.50 0.50 0.45 0.20
JaC: Jácana-----	80	Somewhat limited Too clayey Slow water movement Slope	0.50 0.45 0.04	Somewhat limited Too clayey Slow water movement Slope	0.50 0.45 0.04	Very limited Slope Too clayey Slow water movement Depth to bedrock	1.00 0.50 0.45 0.20

Soil Survey of San Germán Area, Puerto Rico

Table 12a.--Recreational Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
JBA: Joyuda-----	50	Very limited Depth to saturated zone Flooding	1.00 1.00	Very limited Depth to saturated zone Flooding	1.00 0.40	Very limited Depth to saturated zone Flooding	1.00 1.00
Atolladero-----	30	Very limited Flooding Depth to saturated zone Salinity	1.00 0.98 0.50	Somewhat limited Depth to saturated zone Salinity Flooding	0.75 0.50 0.40	Very limited Flooding Depth to saturated zone Salinity	1.00 0.98 0.50
Bajura-----	20	Very limited Depth to saturated zone Flooding Slow water movement Too clayey	1.00 1.00 1.00 1.00	Very limited Depth to saturated zone Slow water movement Too clayey Flooding	1.00 1.00 1.00 0.40	Very limited Slow water movement Depth to saturated zone Flooding Too clayey	1.00 1.00 1.00 1.00
LcE: La Covana-----	60	Very limited Depth to cemented pan Slope Too clayey Slow water movement	1.00 1.00 1.00 0.99	Very limited Depth to cemented pan Slope Too clayey Slow water movement	1.00 1.00 1.00 0.99	Very limited Slope Depth to cemented pan Too clayey Slow water movement Gravel content	1.00 1.00 1.00 0.99 0.78
Limestone outcrop---	20	Not rated		Not rated		Not rated	
Seboruco-----	15	Very limited Slope Slow water movement	1.00 0.99	Very limited Slope Slow water movement	1.00 0.99	Very limited Slope Slow water movement	1.00 0.99
LdA: La Luna-----	90	Very limited Flooding Slow water movement	1.00 0.99	Somewhat limited Slow water movement	0.99	Somewhat limited Slow water movement Flooding	0.99 0.60
LeF: La Tea-----	70	Very limited Slope Depth to bedrock Too clayey Slow water movement Large stones content	1.00 1.00 1.00 0.99 0.01	Very limited Too clayey Slope Depth to bedrock Slow water movement Large stones content	1.00 1.00 1.00 0.99 0.01	Very limited Slope Depth to bedrock Too clayey Slow water movement Large stones content	1.00 1.00 1.00 0.99 0.01
LfC: Landfill-----	100	Not rated		Not rated		Not rated	
LkB: Lares-----	80	Very limited Too clayey Slow water movement	1.00 0.99	Very limited Too clayey Slow water movement	1.00 0.99	Very limited Too clayey Slow water movement Slope	1.00 0.99 0.12

Soil Survey of San Germán Area, Puerto Rico

Table 12a.--Recreational Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LnA: Llanos Costa-----	75	Somewhat limited Slow water movement Dusty	0.99 0.50	Somewhat limited Slow water movement Dusty	0.99 0.50	Somewhat limited Slow water movement Dusty	0.99 0.50
LnB: Llanos Costa-----	75	Somewhat limited Slow water movement Dusty	0.99 0.50	Somewhat limited Slow water movement Dusty	0.99 0.50	Somewhat limited Slow water movement Dusty Slope	0.99 0.50 0.12
LnC: Llanos Costa-----	75	Somewhat limited Slow water movement Dusty	0.99 0.50	Somewhat limited Slow water movement Dusty	0.99 0.50	Very limited Slope Slow water movement Dusty	1.00 0.99 0.50
LpG: Los Peñones-----	60	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00
Limestone outcrop---	40	Not rated		Not rated		Not rated	
MaB: Mabí-----	70	Very limited Flooding Too clayey Depth to saturated zone Slow water movement	1.00 1.00 0.98 0.96	Very limited Too clayey Slow water movement Depth to saturated zone	1.00 0.96 0.75	Very limited Too clayey Depth to saturated zone Slow water movement	1.00 0.98 0.96
MbA: Maguayo-----	80	Very limited Slow water movement Gravel content	1.00 0.38	Very limited Slow water movement Gravel content	1.00 0.38	Very limited Slow water movement Gravel content	1.00 1.00
MbC: Maguayo-----	80	Very limited Slow water movement Gravel content Slope	1.00 0.38 0.01	Very limited Slow water movement Gravel content Slope	1.00 0.38 0.01	Very limited Slow water movement Gravel content Slope	1.00 1.00 1.00
McF: Malaya-----	90	Very limited Slope Too clayey Depth to bedrock Slow water movement	1.00 1.00 1.00 0.99	Very limited Too clayey Slope Depth to bedrock Slow water movement	1.00 1.00 1.00 0.99	Very limited Slope Depth to bedrock Too clayey Slow water movement	1.00 1.00 1.00 0.99

Soil Survey of San Germán Area, Puerto Rico

Table 12a.--Recreational Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MDA: Manglillo-----	50	Very limited Depth to saturated zone Flooding Slow water movement	1.00 1.00 0.96	Very limited Depth to saturated zone Slow water movement Flooding	1.00 0.96 0.40	Very limited Depth to saturated zone Flooding Slow water movement	1.00 1.00 0.96
Boquerón-----	30	Very limited Depth to saturated zone Flooding Slow water movement	1.00 1.00 1.00	Very limited Depth to saturated zone Slow water movement Flooding	1.00 1.00 0.40	Very limited Depth to saturated zone Flooding Slow water movement	1.00 1.00 1.00
Serrano-----	20	Very limited Depth to saturated zone Sodium content Flooding Salinity	1.00 1.00 1.00 0.50	Very limited Depth to saturated zone Sodium content Salinity Flooding	1.00 1.00 0.50 0.40	Very limited Depth to saturated zone Sodium content Flooding Salinity Gravel content	1.00 1.00 1.00 0.50 0.06
MeA: Maní-----	80	Very limited Flooding Too clayey Slow water movement Depth to saturated zone	1.00 1.00 0.99 0.39	Very limited Too clayey Slow water movement Depth to saturated zone	1.00 0.99 0.19	Very limited Too clayey Slow water movement Flooding Depth to saturated zone	1.00 0.99 0.60 0.39
MfF: Maresúa-----	80	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Depth to bedrock Gravel content	1.00 0.80 0.56
MgF: Maresúa-----	40	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Depth to bedrock Gravel content	1.00 0.80 0.56
Serpentine outcrop-----	40	Not rated		Not rated		Not rated	
MiD: Mariana-----	95	Very limited Slope Slow water movement Gravel content	1.00 0.99 0.01	Very limited Slope Slow water movement Gravel content	1.00 0.99 0.01	Very limited Gravel content Slope Slow water movement	1.00 1.00 0.99
MiE: Mariana-----	95	Very limited Slope Slow water movement Gravel content	1.00 0.99 0.01	Very limited Slope Slow water movement Gravel content	1.00 0.99 0.01	Very limited Gravel content Slope Slow water movement	1.00 1.00 0.99

Soil Survey of San Germán Area, Puerto Rico

Table 12a.--Recreational Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MkF: Maricao-----	80	Very limited Slope Too clayey Slow water movement	1.00 1.00 0.99	Very limited Slope Too clayey Slow water movement	1.00 1.00 0.99	Very limited Slope Too clayey Slow water movement	1.00 1.00 0.99
MkG: Maricao-----	80	Very limited Slope Too clayey Slow water movement	1.00 1.00 0.99	Very limited Slope Too clayey Slow water movement	1.00 1.00 0.99	Very limited Slope Too clayey Slow water movement	1.00 1.00 0.99
MnA: Melones-----	95	Very limited Sodium content Too clayey Slow water movement	1.00 0.50 0.45	Very limited Sodium content Too clayey Slow water movement	1.00 0.50 0.45	Very limited Sodium content Too clayey Slow water movement	1.00 0.50 0.45
MnC: Melones-----	95	Very limited Sodium content Too clayey Slow water movement Slope	1.00 0.50 0.45 0.04	Very limited Sodium content Too clayey Slow water movement Slope	1.00 0.50 0.45 0.04	Very limited Sodium content Slope Too clayey Slow water movement	1.00 1.00 0.50 0.45
MoB: Montalva-----	80	Somewhat limited Too clayey Slow water movement	0.50 0.45	Somewhat limited Too clayey Slow water movement	0.50 0.45	Somewhat limited Too clayey Slow water movement Depth to bedrock Slope	0.50 0.45 0.29 0.12
MoC: Montalva-----	80	Somewhat limited Too clayey Slow water movement Slope	0.50 0.45 0.04	Somewhat limited Too clayey Slow water movement Slope	0.50 0.45 0.04	Very limited Slope Too clayey Slow water movement Depth to bedrock	1.00 0.50 0.45 0.29
MqC: Monte grande-----	90	Very limited Too clayey Slow water movement	1.00 0.99	Very limited Too clayey Slow water movement	1.00 0.99	Very limited Too clayey Slope Slow water movement	1.00 1.00 0.99
MrD: Morado-----	85	Very limited Slow water movement Slope	1.00 1.00	Very limited Slow water movement Slope	1.00 1.00	Very limited Slow water movement Slope Depth to bedrock	1.00 1.00 0.99

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Table 12a.--Recreational Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MrE: Morado-----	85	Very limited Slope Slow water movement	1.00 1.00	Very limited Slope Slow water movement	1.00 1.00	Very limited Slow water movement Slope Depth to bedrock	1.00 1.00 0.99
MrF: Morado-----	85	Very limited Slope Slow water movement	1.00 1.00	Very limited Slope Slow water movement	1.00 1.00	Very limited Slow water movement Slope Depth to bedrock	1.00 1.00 0.99
MuC: Múcara-----	80	Somewhat limited Slow water movement Slope	0.99 0.04	Somewhat limited Slow water movement Slope	0.99 0.04	Very limited Slope Slow water movement Depth to bedrock	1.00 0.99 0.29
MuD: Múcara-----	80	Very limited Slope Slow water movement	1.00 0.99	Very limited Slope Slow water movement	1.00 0.99	Very limited Slope Slow water movement Depth to bedrock	1.00 0.99 0.29
MuE: Múcara-----	80	Very limited Slope Slow water movement	1.00 0.99	Very limited Slope Slow water movement	1.00 0.99	Very limited Slope Slow water movement Depth to bedrock	1.00 0.99 0.29
MuF: Múcara-----	80	Very limited Slope Slow water movement	1.00 0.99	Very limited Slope Slow water movement	1.00 0.99	Very limited Slope Slow water movement Depth to bedrock	1.00 0.99 0.29
NpD: Niipe-----	95	Somewhat limited Slope	0.84	Somewhat limited Slope	0.84	Very limited Slope	1.00
OrA: Olivares-----	95	Very limited Ponding Slow water movement	1.00 0.99	Very limited Ponding Slow water movement	1.00 0.99	Very limited Ponding Slow water movement	1.00 0.99
PaA: Palmarejo-----	90	Somewhat limited Slow water movement	0.45	Somewhat limited Slow water movement	0.45	Somewhat limited Slow water movement	0.45
PaB: Palmarejo-----	90	Somewhat limited Slow water movement	0.45	Somewhat limited Slow water movement	0.45	Somewhat limited Slow water movement	0.45

Soil Survey of San Germán Area, Puerto Rico

Table 12a.--Recreational Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
PaC: Palmarejo-----	90	Somewhat limited Slope	0.01	Somewhat limited Slope	0.01	Very limited Slope	1.00
PgA: Parguera-----	80	Very limited Sodium content Too clayey Slow water movement	1.00 1.00 0.96	Very limited Sodium content Too clayey Slow water movement	1.00 1.00 0.96	Very limited Sodium content Too clayey Slow water movement	1.00 1.00 0.96
PgB: Parguera-----	80	Very limited Sodium content Too clayey Slow water movement	1.00 1.00 0.96	Very limited Sodium content Too clayey Slow water movement	1.00 1.00 0.96	Very limited Sodium content Too clayey Slow water movement Slope	1.00 1.00 0.96 0.50
PsF: Pitahaya-----	60	Very limited Slope Depth to bedrock Too clayey Slow water movement	1.00 1.00 0.50 0.45	Very limited Slope Depth to bedrock Too clayey Slow water movement	1.00 1.00 0.50 0.45	Very limited Slope Depth to bedrock Gravel content Too clayey Slow water movement	1.00 1.00 0.64 0.50 0.45
Limestone outcrop---	20	Not rated		Not rated		Not rated	
Seboruco-----	15	Very limited Slope Slow water movement	1.00 0.99	Very limited Slope Slow water movement	1.00 0.99	Very limited Slope Slow water movement	1.00 0.99
PsG: Pitahaya-----	60	Very limited Slope Depth to bedrock Too clayey Slow water movement	1.00 1.00 0.50 0.45	Very limited Slope Depth to bedrock Too clayey Slow water movement	1.00 1.00 0.50 0.45	Very limited Slope Depth to bedrock Gravel content Too clayey Slow water movement	1.00 1.00 0.64 0.50 0.45
Limestone outcrop---	20	Not rated		Not rated		Not rated	
Seboruco-----	15	Very limited Slope Slow water movement	1.00 0.99	Very limited Slope Slow water movement	1.00 0.99	Very limited Slope Slow water movement	1.00 0.99
Pt: Pits and quarries---	100	Not rated		Not rated		Not rated	
PzB: Pozo Blanco-----	95	Very limited Large stones content Too clayey Slow water movement	1.00 0.50 0.39	Very limited Large stones content Too clayey Slow water movement	1.00 0.50 0.39	Very limited Large stones content Too clayey Slow water movement Slope	1.00 0.50 0.39 0.12

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Table 12a.--Recreational Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
PzC: Pozo Blanco-----	95	Very limited Large stones content Too clayey Slow water movement Slope	1.00 0.50 0.39 0.04	Very limited Large stones content Too clayey Slow water movement Slope	1.00 0.50 0.39 0.04	Very limited Large stones content Slope Too clayey Slow water movement	1.00 1.00 0.50 0.39
PzD: Pozo Blanco-----	95	Very limited Large stones content Slope Too clayey Slow water movement	1.00 1.00 0.50 0.39	Very limited Large stones content Slope Too clayey Slow water movement	1.00 1.00 0.50 0.39	Very limited Large stones content Slope Too clayey Slow water movement	1.00 1.00 0.50 0.39
QbD: Quebrada-----	95	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00
QbE: Quebrada-----	95	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00
QbF: Quebrada-----	95	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00
ReA: Reilly-----	95	Very limited Flooding Gravel content	1.00 0.82	Somewhat limited Gravel content Flooding	0.82 0.40	Very limited Gravel content Flooding	1.00 1.00
RoD: Rosario-----	80	Very limited Slope Slow water movement	1.00 0.90	Very limited Slope Slow water movement	1.00 0.90	Very limited Slope Slow water movement Depth to bedrock	1.00 0.90 0.29
RoE: Rosario-----	80	Very limited Slope Slow water movement	1.00 0.90	Very limited Slope Slow water movement	1.00 0.90	Very limited Slope Slow water movement Depth to bedrock	1.00 0.90 0.29
RoF: Rosario-----	80	Very limited Slope Slow water movement	1.00 0.90	Very limited Slope Slow water movement	1.00 0.90	Very limited Slope Slow water movement Depth to bedrock	1.00 0.90 0.29

Soil Survey of San Germán Area, Puerto Rico

Table 12a.--Recreational Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
RuF:							
Rubias-----	60	Very limited Slope Slow water movement	1.00 0.15	Very limited Slope Slow water movement	1.00 0.15	Very limited Slope Depth to bedrock Slow water movement Gravel content	1.00 0.86 0.15 0.01
Chiquito-----	30	Very limited Slope Depth to bedrock Gravel content	1.00 1.00 0.88	Very limited Slope Depth to bedrock Gravel content	1.00 1.00 0.88	Very limited Slope Depth to bedrock Gravel content	1.00 1.00 1.00
RuG:							
Rubias-----	60	Very limited Slope Slow water movement	1.00 0.15	Very limited Slope Slow water movement	1.00 0.15	Very limited Slope Depth to bedrock Slow water movement Gravel content	1.00 0.86 0.15 0.01
Chiquito-----	30	Very limited Slope Depth to bedrock Gravel content	1.00 1.00 0.88	Very limited Slope Depth to bedrock Gravel content	1.00 1.00 0.88	Very limited Slope Depth to bedrock Gravel content	1.00 1.00 1.00
Sa:							
Salt flats, ponded---	100	Not rated		Not rated		Not rated	
Sb:							
Salt pits-----	100	Not rated		Not rated		Not rated	
SCA:							
San Antón-----	95	Very limited Flooding	1.00	Not limited		Somewhat limited Flooding	0.60
SdD:							
San Germán-----	95	Very limited Depth to bedrock Slope Slow water movement	1.00 0.84 0.41	Very limited Depth to bedrock Slope Slow water movement	1.00 0.84 0.41	Very limited Slope Depth to bedrock Gravel content Slow water movement	1.00 1.00 0.69 0.41
SdF:							
San Germán-----	95	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 0.41	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 0.41	Very limited Slope Depth to bedrock Gravel content Slow water movement	1.00 1.00 0.69 0.41
SgD:							
San Germán-----	60	Very limited Depth to bedrock Slope Slow water movement	1.00 0.84 0.41	Very limited Depth to bedrock Slope Slow water movement	1.00 0.84 0.41	Very limited Slope Depth to bedrock Gravel content Slow water movement	1.00 1.00 0.69 0.41

Soil Survey of San Germán Area, Puerto Rico

Table 12a.--Recreational Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
SgD: Duey-----	40	Very limited Depth to bedrock Slope	1.00 0.84	Very limited Depth to bedrock Slope	1.00 0.84	Very limited Depth to bedrock Slope Gravel content	1.00 1.00 0.99
SgF: San Germán-----	60	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 0.41	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 0.41	Very limited Slope Depth to bedrock Gravel content Slow water movement	1.00 1.00 0.69 0.41
Duey-----	40	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock Gravel content	1.00 1.00 0.99
SiA: Santa Isabel-----	95	Somewhat limited Too clayey Slow water movement	0.50 0.45	Somewhat limited Too clayey Slow water movement	0.50 0.45	Somewhat limited Too clayey Slow water movement	0.50 0.45
SmE: Santa Marta-----	95	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Depth to bedrock	1.00 0.03
SoC: Seboruco-----	90	Somewhat limited Slow water movement	0.99	Somewhat limited Slow water movement	0.99	Very limited Slope Slow water movement	1.00 0.99
SsB: Sosa-----	90	Somewhat limited Too sandy Slow water movement	0.66 0.45	Somewhat limited Too sandy Slow water movement	0.66 0.45	Somewhat limited Too sandy Slope Slow water movement	0.66 0.50 0.45
SsC: Sosa-----	90	Somewhat limited Too sandy Slow water movement Slope	0.66 0.45 0.01	Somewhat limited Too sandy Slow water movement Slope	0.66 0.45 0.01	Very limited Slope Too sandy Slow water movement	1.00 0.66 0.45
TeA: Teresa-----	95	Somewhat limited Too clayey Slow water movement	0.50 0.44	Somewhat limited Too clayey Slow water movement	0.50 0.44	Somewhat limited Too clayey Slow water movement	0.50 0.44
TfA: Teresa, ponded-----	95	Very limited Ponding Too clayey Slow water movement	1.00 0.50 0.44	Very limited Ponding Too clayey Slow water movement	1.00 0.50 0.44	Very limited Ponding Too clayey Slow water movement	1.00 0.50 0.44

Soil Survey of San Germán Area, Puerto Rico

Table 12a.--Recreational Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
ToA:							
Toa-----	90	Very limited Flooding	1.00	Not limited		Somewhat limited Flooding	0.60
Ua:							
Urban land-----	100	Not rated		Not rated		Not rated	
Ubb:							
Urban land-----	85	Not rated		Not rated		Not rated	
Bahía-----	10	Very limited Too sandy	1.00	Very limited Too sandy	1.00	Very limited Too sandy Slope	1.00 0.12
UgB:							
Urban land-----	85	Not rated		Not rated		Not rated	
Guayabo-----	10	Very limited Too sandy	1.00	Very limited Too sandy	1.00	Very limited Too sandy Slope	1.00 0.12
Usc:							
Urban land-----	80	Not rated		Not rated		Not rated	
Sosa-----	15	Somewhat limited Too sandy Slow water movement Slope	0.66 0.45 0.01	Somewhat limited Too sandy Slow water movement Slope	0.66 0.45 0.01	Very limited Slope Too sandy Slow water movement	1.00 0.66 0.45
VaA:							
Vayas-----	90	Very limited Depth to saturated zone Flooding Slow water movement	1.00 1.00 0.96	Very limited Depth to saturated zone Slow water movement	1.00 0.96	Very limited Depth to saturated zone Slow water movement Flooding	1.00 0.96 0.60
VoC:							
Voladora-----	90	Very limited Too clayey Slow water movement Slope	1.00 0.99 0.04	Very limited Too clayey Slow water movement Slope	1.00 0.99 0.04	Very limited Too clayey Slope Slow water movement	1.00 1.00 0.99
VoD:							
Voladora-----	90	Very limited Too clayey Slope Slow water movement	1.00 1.00 0.99	Very limited Too clayey Slope Slow water movement	1.00 1.00 0.99	Very limited Slope Too clayey Slow water movement	1.00 1.00 0.99
W:							
Water-----	100	Not rated		Not rated		Not rated	

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Table 12b.--Recreational Development (Part 2)

[The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table]

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AbF: Agüeybaná-----	85	Very limited Slope Too clayey	1.00 1.00	Very limited Too clayey	1.00	Very limited Slope Too clayey	1.00 1.00
AgD: Aguilita-----	90	Not limited		Not limited		Very limited Carbonate content Sodium content Slope Gravel content	1.00 1.00 0.84 0.46
AgF: Aguilita-----	80	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Carbonate content Sodium content Gravel content	1.00 1.00 1.00 0.46
AkA: Aguirre-----	95	Very limited Ponding Too clayey	1.00 0.50	Very limited Ponding Too clayey	1.00 0.50	Very limited Too clayey Ponding	1.00 1.00
AlF: Aljibe-----	40	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Depth to bedrock	1.00 0.10
Guamá-----	30	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00
Indiera-----	25	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00
AtD: Altamira-----	85	Very limited Too clayey	1.00	Very limited Too clayey	1.00	Very limited Carbonate content Too clayey Gravel content Slope	1.00 1.00 0.38 0.01
AtF: Altamira-----	85	Very limited Slope Too clayey	1.00 1.00	Very limited Slope Too clayey	1.00 1.00	Very limited Slope Carbonate content Too clayey Gravel content	1.00 1.00 1.00 0.38
BaB: Bahía-----	90	Very limited Too sandy	1.00	Very limited Too sandy	1.00	Somewhat limited Droughty	0.01

Soil Survey of San Germán Area, Puerto Rico

Table 12b.--Recreational Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BhB: Bahía Salinas-----	90	Very limited Too sandy	1.00	Very limited Too sandy	1.00	Very limited Salinity Droughty Too sandy Large stones content	1.00 1.00 0.50 0.08
BjA: Bajura-----	90	Very limited Depth to saturated zone Too clayey Flooding	1.00 1.00 0.40	Very limited Depth to saturated zone Too clayey Flooding	1.00 1.00 0.40	Very limited Flooding Depth to saturated zone Too clayey	1.00 1.00 1.00
BkB: Beaches-----	100	Not rated		Not rated		Not rated	
BmC: Bermeja-----	70	Somewhat limited Large stones content Too sandy	0.86 0.09	Somewhat limited Large stones content Too sandy	0.86 0.09	Very limited Large stones content Droughty Depth to bedrock Slope	1.00 1.00 1.00 0.01
Cerro Mariquita-----	20	Not limited		Not limited		Very limited Depth to bedrock Droughty Gravel content Slope	1.00 1.00 0.63 0.01
BmD: Bermeja-----	70	Somewhat limited Large stones content Too sandy Slope	0.86 0.09 0.02	Somewhat limited Large stones content Too sandy	0.86 0.09	Very limited Large stones content Droughty Depth to bedrock Slope	1.00 1.00 1.00 1.00
Cerro Mariquita-----	20	Somewhat limited Slope	0.02	Not limited		Very limited Depth to bedrock Droughty Slope Gravel content	1.00 1.00 1.00 0.63
BmF: Bermeja-----	75	Very limited Slope Large stones content Too sandy	1.00 0.86 0.09	Very limited Slope Large stones content Too sandy	1.00 0.86 0.09	Very limited Slope Large stones content Droughty Depth to bedrock	1.00 1.00 1.00 1.00
Cerro Mariquita-----	20	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Depth to bedrock Slope Droughty Gravel content	1.00 1.00 1.00 0.63

Soil Survey of San Germán Area, Puerto Rico

Table 12b.--Recreational Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BrF: Bermeja-----	75	Very limited Slope Large stones content Too sandy	1.00 0.86 0.09	Very limited Slope Large stones content Too sandy	1.00 0.86 0.09	Very limited Slope Large stones content Droughty Depth to bedrock	1.00 1.00 1.00 1.00
Rock outcrop-----	15	Not rated		Not rated		Not rated	
CaC: Cabo Rojo-----	90	Not limited		Not limited		Not limited	
CbD: Caguabo-----	85	Not limited		Not limited		Very limited Droughty Depth to bedrock Slope Gravel content	1.00 1.00 1.00 0.88
CbF: Caguabo-----	85	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Droughty Depth to bedrock Gravel content	1.00 1.00 1.00 0.88
CeA: Cartagena-----	85	Very limited Ponding Too clayey	1.00 0.50	Very limited Ponding Too clayey	1.00 0.50	Very limited Too clayey Sodium content Ponding Salinity	1.00 1.00 1.00 0.50
CgD: Casabe-----	90	Somewhat limited Too clayey Slope	0.50 0.32	Somewhat limited Too clayey	0.50	Very limited Depth to bedrock Droughty Too clayey Slope	1.00 1.00 1.00 1.00
CgF: Casabe-----	90	Very limited Slope Too clayey	1.00 0.50	Very limited Slope Too clayey	1.00 0.50	Very limited Depth to bedrock Slope Droughty Too clayey	1.00 1.00 1.00 1.00
ChA: Cataño-----	95	Very limited Too sandy	1.00	Very limited Too sandy	1.00	Very limited Too sandy Droughty	1.00 0.63
CjD: Cerro Gordo-----	90	Not limited		Not limited		Somewhat limited Slope	0.63

Soil Survey of San Germán Area, Puerto Rico

Table 12b.--Recreational Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CkD: Cerro Mariquita-----	80	Somewhat limited Slope	0.08	Not limited		Very limited Depth to bedrock Droughty Slope Gravel content	1.00 1.00 1.00 0.63
CkF: Cerro Mariquita-----	80	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Depth to bedrock Slope Droughty Gravel content	1.00 1.00 1.00 0.63
CmB: Coamo-----	90	Not limited		Not limited		Somewhat limited Slope	0.04
CoA: Coloso-----	90	Very limited Too clayey	1.00	Very limited Too clayey	1.00	Very limited Too clayey Flooding Depth to saturated zone	1.00 0.60 0.19
CsE: Consumo-----	80	Very limited Slope	1.00	Somewhat limited Slope	0.22	Very limited Slope	1.00
CsF: Consumo-----	80	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00
CtA: Cortada-----	98	Not limited		Not limited		Somewhat limited Flooding	0.60
CuD: Costa-----	67	Somewhat limited Too clayey	0.50	Somewhat limited Too clayey	0.50	Very limited Droughty Carbonate content Depth to bedrock Too clayey Slope	1.00 1.00 1.00 1.00 1.00
Pitahaya-----	25	Somewhat limited Too clayey	0.50	Somewhat limited Too clayey	0.50	Very limited Droughty Carbonate content Depth to bedrock Too clayey	1.00 1.00 1.00 1.00
CuF: Costa-----	67	Very limited Slope Too clayey	1.00 0.50	Very limited Slope Too clayey	1.00 0.50	Very limited Slope Droughty Carbonate content Depth to bedrock Too clayey	1.00 1.00 1.00 1.00 1.00

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Table 12b.--Recreational Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CuF: Pitahaya-----	25	Very limited Slope Too clayey	1.00 0.50	Very limited Slope Too clayey	1.00 0.50	Very limited Slope Droughty Carbonate content Depth to bedrock Too clayey	1.00 1.00 1.00 1.00 1.00
CVF: Cuchillas-----	80	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Depth to bedrock Droughty	1.00 1.00 0.67
CVG: Cuchillas-----	80	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Depth to bedrock Droughty	1.00 1.00 0.67
DeD: Delicias-----	95	Somewhat limited Too clayey	0.50	Somewhat limited Too clayey	0.50	Very limited Too clayey Slope	1.00 0.84
DqA: Dique-----	90	Somewhat limited Flooding	0.40	Somewhat limited Flooding	0.40	Very limited Flooding	1.00
DsC: Descalabrado-----	90	Somewhat limited Too clayey	0.50	Somewhat limited Too clayey	0.50	Very limited Depth to bedrock Droughty Too clayey Gravel content	1.00 1.00 1.00 0.01
DsD: Descalabrado-----	90	Somewhat limited Too clayey Slope	0.50 0.02	Somewhat limited Too clayey	0.50	Very limited Depth to bedrock Droughty Slope Too clayey Gravel content	1.00 1.00 1.00 1.00 0.01
DsF: Descalabrado-----	90	Very limited Slope Too clayey	1.00 0.50	Very limited Slope Too clayey	1.00 0.50	Very limited Depth to bedrock Slope Droughty Too clayey Gravel content	1.00 1.00 1.00 1.00 0.01
EcD: El Cacique-----	60	Not limited		Not limited		Very limited Depth to bedrock Droughty Slope	1.00 1.00 0.84

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Table 12b.--Recreational Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
EcD:							
La Taína-----	30	Very limited Too clayey	1.00	Very limited Too clayey	1.00	Very limited Depth to bedrock Too clayey Gravel content Slope Droughty	1.00 1.00 1.00 0.84 0.69
EcF:							
El Cacique-----	60	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Depth to bedrock Slope Droughty	1.00 1.00 1.00
La Taína-----	30	Very limited Slope Too clayey	1.00 1.00	Very limited Slope Too clayey	1.00 1.00	Very limited Slope Depth to bedrock Too clayey Gravel content Droughty	1.00 1.00 1.00 1.00 0.69
EcG:							
El Cacique-----	60	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Depth to bedrock Slope Droughty	1.00 1.00 1.00
La Taína-----	30	Very limited Slope Too clayey	1.00 1.00	Very limited Slope Too clayey	1.00 1.00	Very limited Slope Depth to bedrock Too clayey Gravel content Droughty	1.00 1.00 1.00 1.00 0.69
EdD:							
El Descanso-----	50	Not limited		Not limited		Very limited Depth to bedrock Slope Droughty	1.00 0.84 0.83
Hoconuco-----	45	Somewhat limited Large stones content	0.10	Somewhat limited Large stones content	0.10	Very limited Droughty Depth to bedrock Large stones content Slope	1.00 1.00 1.00 0.84
EdF:							
El Descanso-----	50	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Depth to bedrock Slope Droughty	1.00 1.00 0.83
Hoconuco-----	45	Very limited Slope Large stones content	1.00 0.10	Very limited Slope Large stones content	1.00 0.10	Very limited Slope Droughty Depth to bedrock Large stones content	1.00 1.00 1.00 1.00

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Table 12b.--Recreational Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
EdG: El Descanso-----	50	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Depth to bedrock Slope Droughty	1.00 1.00 0.83
Hoconuco-----	45	Very limited Slope Large stones content	1.00 0.10	Very limited Slope Large stones content	1.00 0.10	Very limited Slope Droughty Depth to bedrock Large stones content	1.00 1.00 1.00 1.00
EpC: El Papayo-----	95	Not limited		Not limited		Very limited Depth to bedrock Droughty Gravel content	1.00 1.00 0.61
EpD: El Papayo-----	95	Somewhat limited Slope	0.02	Not limited		Very limited Depth to bedrock Droughty Slope Gravel content	1.00 1.00 1.00 0.61
EpF: El Papayo-----	95	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Depth to bedrock Slope Droughty Gravel content	1.00 1.00 1.00 0.61
FeA: Fé-----	95	Somewhat limited Too clayey	0.50	Somewhat limited Too clayey	0.50	Very limited Too clayey Sodium content Salinity	1.00 1.00 0.50
FrA: Fraternidad-----	90	Somewhat limited Too clayey	0.50	Somewhat limited Too clayey	0.50	Very limited Too clayey	1.00
FrB: Fraternidad-----	90	Somewhat limited Too clayey	0.50	Somewhat limited Too clayey	0.50	Very limited Too clayey	1.00
GbF: Guanábano-----	95	Very limited Slope Too clayey	1.00 0.50	Very limited Slope Too clayey	1.00 0.50	Very limited Slope Too clayey Large stones content	1.00 1.00 0.26
GhC: Guanajibo-----	90	Not limited		Not limited		Somewhat limited Droughty	0.97

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Table 12b.--Recreational Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GnA: Guánica-----	80	Very limited Too clayey Ponding	1.00 1.00	Very limited Too clayey Ponding	1.00 1.00	Very limited Too clayey Ponding Sodium content	1.00 1.00 1.00
GuB: Guayabo-----	90	Very limited Too sandy	1.00	Very limited Too sandy	1.00	Somewhat limited Droughty Too sandy	0.69 0.50
GyB: Guayacán-----	90	Very limited Too clayey	1.00	Very limited Too clayey	1.00	Very limited Too clayey	1.00
GyC: Guayacán-----	90	Very limited Too clayey	1.00	Very limited Too clayey	1.00	Very limited Too clayey Slope	1.00 0.04
GyD: Guayacán-----	90	Very limited Too clayey Slope	1.00 0.02	Very limited Too clayey	1.00	Very limited Slope Too clayey	1.00 1.00
HmD: Humatas-----	80	Very limited Too clayey Slope	1.00 0.02	Very limited Too clayey	1.00	Very limited Slope Too clayey	1.00 1.00
HmE: Humatas-----	80	Very limited Slope Too clayey	1.00 1.00	Very limited Too clayey Slope	1.00 0.22	Very limited Slope Too clayey	1.00 1.00
HmF: Humatas-----	80	Very limited Slope Too clayey	1.00 1.00	Very limited Slope Too clayey	1.00 1.00	Very limited Slope Too clayey	1.00 1.00
JaB: Jácana-----	80	Somewhat limited Too clayey	0.50	Somewhat limited Too clayey	0.50	Very limited Too clayey Depth to bedrock	1.00 0.20
JaC: Jácana-----	80	Somewhat limited Too clayey	0.50	Somewhat limited Too clayey	0.50	Very limited Too clayey Depth to bedrock Slope	1.00 0.20 0.04
JBA: Joyuda-----	50	Very limited Depth to saturated zone Flooding	1.00 0.40	Very limited Depth to saturated zone Flooding	1.00 0.40	Very limited Flooding Depth to saturated zone	1.00 1.00

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Table 12b.--Recreational Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
JBA: Atolladero-----	30	Somewhat limited Depth to saturated zone Flooding	0.44 0.40	Somewhat limited Depth to saturated zone Flooding	0.44 0.40	Very limited Flooding Depth to saturated zone Salinity Droughty	1.00 0.75 0.50 0.48
Bajura-----	20	Very limited Depth to saturated zone Too clayey Flooding	1.00 1.00 0.40	Very limited Depth to saturated zone Too clayey Flooding	1.00 1.00 0.40	Very limited Flooding Depth to saturated zone Too clayey	1.00 1.00 1.00
LcE: La Covana-----	60	Very limited Too clayey Slope	1.00 0.50	Very limited Too clayey	1.00	Very limited Depth to cemented pan Droughty Carbonate content Slope Too clayey	1.00 1.00 1.00 1.00 1.00
Limestone outcrop---	20	Not rated		Not rated		Not rated	
Seboruco-----	15	Somewhat limited Slope	0.50	Not limited		Very limited Carbonate content Slope Droughty	1.00 1.00 0.84
LdA: La Luna-----	90	Not limited		Not limited		Somewhat limited Flooding	0.60
LeF: La Tea-----	70	Very limited Too clayey Slope Large stones content	1.00 1.00 0.01	Very limited Too clayey Slope Large stones content	1.00 1.00 0.01	Very limited Too clayey Depth to bedrock Slope Droughty Large stones content	1.00 1.00 1.00 1.00 0.97
LfC: Landfill-----	100	Not rated		Not rated		Not rated	
LkB: Lares-----	80	Very limited Too clayey	1.00	Very limited Too clayey	1.00	Very limited Too clayey	1.00
LnA: Llanos Costa-----	75	Somewhat limited Dusty	0.50	Somewhat limited Dusty	0.50	Not limited	
LnB: Llanos Costa-----	75	Somewhat limited Dusty	0.50	Somewhat limited Dusty	0.50	Not limited	
LnC: Llanos Costa-----	75	Somewhat limited Dusty	0.50	Somewhat limited Dusty	0.50	Not limited	

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Table 12b.--Recreational Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LpG: Los Peñones-----	60	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Depth to bedrock Slope Droughty	1.00 1.00 1.00
Limestone outcrop---	40	Not rated		Not rated		Not rated	
MaB: Mabí-----	70	Very limited Too clayey Depth to saturated zone	1.00 0.44	Very limited Too clayey Depth to saturated zone	1.00 0.44	Very limited Too clayey Depth to saturated zone	1.00 0.75
MbA: Maguayo-----	80	Not limited		Not limited		Somewhat limited Gravel content	0.38
MbC: Maguayo-----	80	Not limited		Not limited		Somewhat limited Gravel content Slope	0.38 0.01
McF: Malaya-----	90	Very limited Too clayey Slope	1.00 1.00	Very limited Too clayey Slope	1.00 1.00	Very limited Too clayey Depth to bedrock Slope Droughty	1.00 1.00 1.00 1.00
MDA: Manglillo-----	50	Very limited Depth to saturated zone Flooding	1.00 0.40	Very limited Depth to saturated zone Flooding	1.00 0.40	Very limited Flooding Depth to saturated zone	1.00 1.00
Boquerón-----	30	Very limited Depth to saturated zone Flooding	1.00 0.40	Very limited Depth to saturated zone Flooding	1.00 0.40	Very limited Flooding Depth to saturated zone	1.00 1.00
Serrano-----	20	Very limited Depth to saturated zone Flooding	1.00 0.40	Very limited Depth to saturated zone Flooding	1.00 0.40	Very limited Flooding Sodium content Depth to saturated zone Droughty Salinity	1.00 1.00 1.00 0.96 0.50
MeA: Maní-----	80	Very limited Too clayey	1.00	Very limited Too clayey	1.00	Very limited Too clayey Flooding Depth to saturated zone	1.00 0.60 0.19
MfF: Maresúa-----	80	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Depth to bedrock Droughty	1.00 0.80 0.15

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Table 12b.--Recreational Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MgF: Maresúa-----	40	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Depth to bedrock Droughty	1.00 0.80 0.15
Serpentine outcrop-----	40	Not rated		Not rated		Not rated	
MiD: Mariana-----	95	Somewhat limited Slope	0.02	Not limited		Very limited Slope Gravel content	1.00 0.01
MiE: Mariana-----	95	Very limited Slope	1.00	Somewhat limited Slope	0.78	Very limited Slope Gravel content	1.00 0.01
MkF: Maricao-----	80	Very limited Slope Too clayey	1.00 1.00	Very limited Slope Too clayey	1.00 1.00	Very limited Slope Too clayey Large stones content	1.00 1.00 0.01
MkG: Maricao-----	80	Very limited Slope Too clayey	1.00 1.00	Very limited Slope Too clayey	1.00 1.00	Very limited Slope Too clayey Large stones content	1.00 1.00 0.01
MnA: Melones-----	95	Somewhat limited Too clayey	0.50	Somewhat limited Too clayey	0.50	Very limited Sodium content Too clayey	1.00 1.00
MnC: Melones-----	95	Somewhat limited Too clayey	0.50	Somewhat limited Too clayey	0.50	Very limited Sodium content Too clayey Slope	1.00 1.00 0.04
MoB: Montalva-----	80	Somewhat limited Too clayey	0.50	Somewhat limited Too clayey	0.50	Very limited Too clayey Depth to bedrock	1.00 0.29
MoC: Montalva-----	80	Somewhat limited Too clayey	0.50	Somewhat limited Too clayey	0.50	Very limited Too clayey Depth to bedrock Slope	1.00 0.29 0.04
MqC: Montegrando-----	90	Very limited Too clayey	1.00	Very limited Too clayey	1.00	Very limited Too clayey	1.00

Soil Survey of San Germán Area, Puerto Rico

Table 12b.--Recreational Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MrD: Morado-----	85	Somewhat limited Slope	0.02	Not limited		Very limited Slope Depth to bedrock Droughty	1.00 0.99 0.16
MrE: Morado-----	85	Very limited Slope	1.00	Somewhat limited Slope	0.22	Very limited Slope Depth to bedrock Droughty	1.00 0.99 0.16
MrF: Morado-----	85	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Depth to bedrock Droughty	1.00 0.99 0.16
MuC: Múcara-----	80	Not limited		Not limited		Somewhat limited Depth to bedrock Droughty Slope	0.29 0.25 0.04
MuD: Múcara-----	80	Somewhat limited Slope	0.02	Not limited		Very limited Slope Depth to bedrock Droughty	1.00 0.29 0.25
MuE: Múcara-----	80	Very limited Slope	1.00	Somewhat limited Slope	0.22	Very limited Slope Depth to bedrock Droughty	1.00 0.29 0.25
MuF: Múcara-----	80	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Depth to bedrock Droughty	1.00 0.29 0.25
NpD: Nipe-----	95	Not limited		Not limited		Somewhat limited Slope	0.84
OrA: Olivares-----	95	Very limited Ponding	1.00	Very limited Ponding	1.00	Very limited Ponding Droughty	1.00 0.52
PaA: Palmarejo-----	90	Not limited		Not limited		Not limited	
PaB: Palmarejo-----	90	Not limited		Not limited		Not limited	
PaC: Palmarejo-----	90	Not limited		Not limited		Somewhat limited Slope	0.01

Soil Survey of San Germán Area, Puerto Rico

Table 12b.--Recreational Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
PgA: Parguera-----	80	Very limited Too clayey	1.00	Very limited Too clayey	1.00	Very limited Sodium content Carbonate content Too clayey	1.00 1.00 1.00
PgB: Parguera-----	80	Very limited Too clayey	1.00	Very limited Too clayey	1.00	Very limited Sodium content Carbonate content Too clayey	1.00 1.00 1.00
PsF: Pitahaya-----	60	Very limited Slope Too clayey	1.00 0.50	Very limited Slope Too clayey	1.00 0.50	Very limited Slope Droughty Carbonate content Depth to bedrock Too clayey	1.00 1.00 1.00 1.00 1.00
Limestone outcrop---	20	Not rated		Not rated		Not rated	
Seboruco-----	15	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Carbonate content Droughty	1.00 1.00 0.84
PsG: Pitahaya-----	60	Very limited Slope Too clayey	1.00 0.50	Very limited Slope Too clayey	1.00 0.50	Very limited Slope Droughty Carbonate content Depth to bedrock Too clayey	1.00 1.00 1.00 1.00 1.00
Limestone outcrop---	20	Not rated		Not rated		Not rated	
Seboruco-----	15	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Carbonate content Droughty	1.00 1.00 0.84
Pt: Pits and quarries---	100	Not rated		Not rated		Not rated	
PzB: Pozo Blanco-----	95	Very limited Large stones content Too clayey	1.00 0.50	Very limited Large stones content Too clayey	1.00 0.50	Very limited Large stones content Too clayey Carbonate content	1.00 1.00 1.00 1.00
PzC: Pozo Blanco-----	95	Very limited Large stones content Too clayey	1.00 0.50	Very limited Large stones content Too clayey	1.00 0.50	Very limited Large stones content Too clayey Carbonate content Slope	1.00 1.00 1.00 0.04

Soil Survey of San Germán Area, Puerto Rico

Table 12b.--Recreational Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
PzD: Pozo Blanco-----	95	Very limited Large stones content Too clayey Slope	1.00 0.50 0.02	Very limited Large stones content Too clayey	1.00 0.50	Very limited Large stones content Slope Too clayey Carbonate content	1.00 1.00 1.00 1.00
QbD: Quebrada-----	95	Somewhat limited Slope	0.02	Not limited		Very limited Depth to bedrock Slope Droughty	1.00 1.00 0.16
QbE: Quebrada-----	95	Very limited Slope	1.00	Somewhat limited Slope	0.22	Very limited Depth to bedrock Slope Droughty	1.00 1.00 0.16
QbF: Quebrada-----	95	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Depth to bedrock Slope Droughty	1.00 1.00 0.16
ReA: Reilly-----	95	Somewhat limited Flooding	0.40	Somewhat limited Flooding	0.40	Very limited Flooding Droughty Gravel content	1.00 1.00 0.82
RoD: Rosario-----	80	Not limited		Not limited		Very limited Slope Depth to bedrock	1.00 0.29
RoE: Rosario-----	80	Very limited Slope	1.00	Somewhat limited Slope	0.22	Very limited Slope Depth to bedrock	1.00 0.29
RoF: Rosario-----	80	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Depth to bedrock	1.00 0.29
RuF: Rubias-----	60	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Depth to bedrock	1.00 0.86
Chiquito -----	30	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Depth to bedrock Slope Gravel content Droughty	1.00 1.00 0.88 0.35

Soil Survey of San Germán Area, Puerto Rico

Table 12b.--Recreational Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
RuG:							
Rubias-----	60	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Depth to bedrock	1.00 0.86
Chiquito-----	30	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Depth to bedrock Slope Gravel content Droughty	1.00 1.00 0.88 0.35
Sa:							
Salt flats, ponded---	100	Not rated		Not rated		Not rated	
Sb:							
Salt pits-----	100	Not rated		Not rated		Not rated	
SCA:							
San Antón-----	95	Not limited		Not limited		Somewhat limited Flooding	0.60
SdD:							
San Germán-----	95	Not limited		Not limited		Very limited Droughty Depth to bedrock Carbonate content Slope Large stones content	1.00 1.00 1.00 0.84 0.20
SdF:							
San Germán-----	95	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Droughty Depth to bedrock Carbonate content Large stones content	1.00 1.00 1.00 1.00 0.20
SgD:							
San Germán-----	60	Not limited		Not limited		Very limited Droughty Depth to bedrock Carbonate content Slope Large stones content	1.00 1.00 1.00 0.84 0.20
Duey-----	40	Not limited		Not limited		Very limited Droughty Depth to bedrock Carbonate content Slope	1.00 1.00 1.00 0.84

Soil Survey of San Germán Area, Puerto Rico

Table 12b.--Recreational Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
SgF: San Germán-----	60	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Droughty Depth to bedrock Carbonate content Large stones content	1.00 1.00 1.00 1.00 0.20
Duey -----	40	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Droughty Depth to bedrock Carbonate content	1.00 1.00 1.00 1.00
SiA: Santa Isabel-----	95	Somewhat limited Too clayey	0.50	Somewhat limited Too clayey	0.50	Very limited Too clayey	1.00
SmE: Santa Marta-----	95	Very limited Slope	1.00	Somewhat limited Slope	0.22	Very limited Slope Depth to bedrock	1.00 0.03
SoC: Seboruco-----	90	Not limited		Not limited		Very limited Carbonate content Droughty	1.00 0.84
SsB: Sosa-----	90	Somewhat limited Too sandy	0.66	Somewhat limited Too sandy	0.66	Somewhat limited Droughty	0.10
SsC: Sosa-----	90	Somewhat limited Too sandy	0.66	Somewhat limited Too sandy	0.66	Somewhat limited Droughty Slope	0.10 0.01
TeA: Teresa-----	95	Somewhat limited Too clayey	0.50	Somewhat limited Too clayey	0.50	Very limited Too clayey	1.00
TfA: Teresa, ponded-----	95	Very limited Ponding Too clayey	1.00 0.50	Very limited Ponding Too clayey	1.00 0.50	Very limited Too clayey Ponding	1.00 1.00
ToA: Toa-----	90	Not limited		Not limited		Somewhat limited Flooding	0.60
Ua: Urban land-----	100	Not rated		Not rated		Not rated	
Ubb: Urban land-----	85	Not rated		Not rated		Not rated	
Bahía -----	10	Very limited Too sandy	1.00	Very limited Too sandy	1.00	Somewhat limited Droughty	0.01

Soil Survey of San Germán Area, Puerto Rico

Table 12b.--Recreational Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Paths and trails		Off-road motorcycle trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
UgB:							
Urban land-----	85	Not rated		Not rated		Not rated	
Guayabo-----	10	Very limited Too sandy	1.00	Very limited Too sandy	1.00	Somewhat limited Droughty Too sandy	0.69 0.50
UsC:							
Urban land-----	80	Not rated		Not rated		Not rated	
Sosa-----	15	Somewhat limited Too sandy	0.66	Somewhat limited Too sandy	0.66	Somewhat limited Droughty Slope	0.10 0.01
VaA:							
Vayas-----	90	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone Flooding	1.00 0.60
VoC:							
Voladora-----	90	Very limited Too clayey	1.00	Very limited Too clayey	1.00	Very limited Too clayey Slope	1.00 0.04
VoD:							
Voladora-----	90	Very limited Too clayey Slope	1.00 0.02	Very limited Too clayey	1.00	Very limited Too clayey Slope	1.00 1.00
W:							
Water-----	100	Not rated		Not rated		Not rated	

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Table 13.--Hydric Soils

[Only those map unit components that are rated as hydric are listed. Definitions of hydric criteria codes are included at the end of the table]

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
AkA: Aguirre clay, occasionally ponded-----	Aguirre	95	Basin floors	Yes	3
BjA: Bajura clay, 0 to 1 percent slopes, frequently flooded-----	Bajura	90	Flood plains	Yes	2B3
CeA: Cartagena clay, 0 to 2 percent slopes-----	Aguirre	15	Basin floors	Yes	3
ChA: Cataño sand, 0 to 2 percent slopes-----	Atolladero Joyuda	3 2	Tidal marshes Salt marshes	Yes Yes	2B2 4, 1
CoA: Coloso clay, 0 to 2 percent slopes, occasionally flooded-----	Bajura	5	Flood plains	Yes	2B3
CtA: Cortada silty clay loam, 0 to 2 percent slopes, occasionally flooded-----	Vayas	1	Flood plains	Yes	2B3
GnA: Guánica clay, 0 to 1 percent slopes-----	Guánica Aguirre	80 10	Basin floors Basin floors	Yes Yes	3 3
JBA: Joyuda, Atolladero, and Bajura soils, very frequently flooded---	Joyuda Atolladero Bajura	50 30 20	Salt marshes Tidal marshes Flood plains	Yes Yes Yes	1, 4 2B2 2B3
LdA: La Luna silty clay loam, 0 to 2 percent slopes, occasionally flooded-----	Vayas	10	Flood plains	Yes	2B3
LkB: Lares clay, 0 to 5 percent slopes-----	Bajura	3	Flood plains	Yes	2B3
MDA: Manglillo, Boquerón, and Serrano soils, very frequently flooded---	Manglillo Boquerón Serrano	50 30 20	Salt marshes Marshes, tidal flats Tidal flats	Yes Yes Yes	1, 4 2B3 2B2
OrA: Olivares muck, ponded-----	Olivares Teresa, ponded	95 3	Alluvial flats, depressions Alluvial flats, valley floors	Yes Yes	3 3

Soil Survey of San Germán Area, Puerto Rico

Table 13.--Hydric Soils--Continued

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
Sb: Salt pits-----	Salt pits	100	Tidal flats	Yes	2B1
ScA: San Antón clay loam, 0 to 2 percent slopes, occasionally flooded-----	Vayas	2	Flood plains	Yes	2B3
TeA: Teresa clay, 0 to 1 percent slopes-----	Teresa, ponded	5	Alluvial flats,	Yes	3
TfA: Teresa clay, ponded-----	Teresa, ponded	95	Alluvial flats, valley floors	Yes	3
	Manglillo Boquerón	3	Salt marshes	Yes	1, 4
		1	Marshes, tidal flats	Yes	2B3
	Serrano	1	Tidal flats	Yes	2B2
ToA: Toa clay loam, 0 to 2 percent slopes, occasionally flooded-----	Bajura	5	Flood plains	Yes	2B3
VaA: Vayas silty clay, 0 to 2 percent slopes, occasionally flooded-----	Vayas	90	Flood plains	Yes	2B3

Explanation of hydric criteria codes:

- All Histels except for Folistels, and Histosols except for Folists.
- Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
 - are somewhat poorly drained and have a water table at the surface (0.0 feet) during the growing season, or
 - are poorly drained or very poorly drained and have either:
 - a water table at the surface (0.0 feet) during the growing season if textures are coarse sand, sand, or fine sand in all layers within a depth of 20 inches, or
 - a water table at a depth of 0.5 foot or less during the growing season if permeability is equal to or greater than 6.0 in/hr in all layers within a depth of 20 inches, or
 - a water table at a depth of 1.0 foot or less during the growing season if permeability is less than 6.0 in/hr in any layer within a depth of 20 inches.
- Soils that are frequently ponded for long or very long duration during the growing season.
- Soils that are frequently flooded for long or very long duration during the growing season.

Soil Survey of San Germán Area, Puerto Rico

Table 14a.--Building Site Development (Part 1)

[The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table]

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AbF: Agüeybaná-----	85	Very limited Slope Shrink-swell	1.00 0.78	Very limited Slope Shrink-swell	1.00 0.78	Very limited Slope Shrink-swell	1.00 0.78
AgD: Aguilita-----	90	Somewhat limited Slope Shrink-swell	0.84 0.22	Somewhat limited Slope Shrink-swell	0.84 0.22	Very limited Slope Shrink-swell	1.00 0.22
AgF: Aguilita-----	80	Very limited Slope Shrink-swell	1.00 0.22	Very limited Slope Shrink-swell	1.00 0.22	Very limited Slope Shrink-swell	1.00 0.22
AkA: Aguirre-----	95	Very limited Ponding Shrink-swell	1.00 1.00	Very limited Ponding Shrink-swell	1.00 1.00	Very limited Ponding Shrink-swell	1.00 1.00
AlF: Aljibe-----	40	Very limited Slope	1.00	Very limited Slope Depth to hard bedrock Depth to soft bedrock	1.00 0.71 0.10	Very limited Slope	1.00
Guamá-----	30	Very limited Slope Shrink-swell	1.00 0.50	Very limited Slope Shrink-swell	1.00 0.50	Very limited Slope Shrink-swell	1.00 0.50
Indiera-----	25	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00
AtD: Altamira-----	85	Somewhat limited Shrink-swell Slope	0.99 0.01	Very limited Shrink-swell Slope	1.00 0.01	Very limited Slope Shrink-swell	1.00 0.99
AtF: Altamira-----	85	Very limited Slope Shrink-swell	1.00 0.99	Very limited Slope Shrink-swell	1.00 1.00	Very limited Slope Shrink-swell	1.00 0.99
BaB: Bahía-----	90	Not limited		Not limited		Not limited	
BhB: Bahía Salinas-----	90	Not limited		Not limited		Not limited	

Soil Survey of San Germán Area, Puerto Rico

Table 14a.--Building Site Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BjA: Bajura-----	90	Very limited Flooding Depth to saturated zone Shrink-swell	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone Shrink-swell	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone Shrink-swell	1.00 1.00 1.00
BkB: Beaches-----	100	Not rated		Not rated		Not rated	
BmC: Bermeja-----	70	Somewhat limited Large stones content Depth to hard bedrock Shrink-swell Depth to soft bedrock Slope	0.74 0.74 0.50 0.50 0.01	Very limited Depth to hard bedrock Depth to soft bedrock Large stones content Shrink-swell Slope	1.00 1.00 0.74 0.50 0.01	Very limited Depth to soft bedrock Slope Large stones content Depth to hard bedrock Shrink-swell	1.00 1.00 0.74 0.74 0.50
Cerro Mariquita----	20	Somewhat limited Depth to hard bedrock Shrink-swell Depth to soft bedrock Large stones content Slope	0.95 0.50 0.50 0.06 0.01	Very limited Depth to hard bedrock Depth to soft bedrock Shrink-swell Large stones content Slope	1.00 1.00 0.50 0.06 0.01	Very limited Depth to soft bedrock Slope Depth to hard bedrock Shrink-swell Large stones content	1.00 1.00 0.95 0.50 0.06
BmD: Bermeja-----	70	Very limited Slope Large stones content Depth to hard bedrock Shrink-swell Depth to soft bedrock	1.00 0.74 0.74 0.50 0.50	Very limited Depth to hard bedrock Depth to soft bedrock Slope Large stones content Shrink-swell	1.00 1.00 1.00 0.74 0.50	Very limited Slope Depth to soft bedrock Large stones content Depth to hard bedrock Shrink-swell	1.00 1.00 0.74 0.74 0.50
Cerro Mariquita----	20	Very limited Slope Depth to hard bedrock Shrink-swell Depth to soft bedrock Large stones content	1.00 0.95 0.50 0.50 0.06	Very limited Depth to hard bedrock Depth to soft bedrock Slope Shrink-swell Large stones content	1.00 1.00 1.00 0.50 0.06	Very limited Slope Depth to soft bedrock Depth to hard bedrock Shrink-swell Large stones content	1.00 1.00 0.95 0.50 0.06

Soil Survey of San Germán Area, Puerto Rico

Table 14a.--Building Site Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BmF: Bermeja-----	75	Very limited Slope Large stones content Depth to hard bedrock Shrink-swell Depth to soft bedrock	1.00 0.74 0.74 0.50 0.50	Very limited Slope Depth to hard bedrock Depth to soft bedrock Large stones content Shrink-swell	1.00 1.00 1.00 0.74 0.50	Very limited Slope Depth to soft bedrock Large stones content Depth to hard bedrock Shrink-swell	1.00 1.00 0.74 0.74 0.50
Cerro Mariquita----	20	Very limited Slope Depth to hard bedrock Shrink-swell Depth to soft bedrock Large stones content	1.00 0.95 0.50 0.50 0.06	Very limited Slope Depth to hard bedrock Depth to soft bedrock Shrink-swell Large stones content	1.00 1.00 1.00 0.50 0.06	Very limited Slope Depth to soft bedrock Depth to hard bedrock Shrink-swell Large stones content	1.00 1.00 0.95 0.50 0.06
BrF: Bermeja-----	75	Very limited Slope Large stones content Depth to hard bedrock Shrink-swell Depth to soft bedrock	1.00 0.74 0.74 0.50 0.50	Very limited Slope Depth to hard bedrock Depth to soft bedrock Large stones content Shrink-swell	1.00 1.00 1.00 0.74 0.50	Very limited Slope Depth to soft bedrock Large stones content Depth to hard bedrock Shrink-swell	1.00 1.00 0.74 0.74 0.50
Rock outcrop-----	15	Not rated		Not rated		Not rated	
CaC: Cabo Rojo-----	90	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50	Somewhat limited Slope Shrink-swell	0.88 0.50
CbD: Caguabo-----	85	Very limited Depth to hard bedrock Slope Depth to soft bedrock	1.00 1.00 0.50	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00 1.00	Very limited Slope Depth to hard bedrock Depth to soft bedrock	1.00 1.00 1.00
CbF: Caguabo-----	85	Very limited Slope Depth to hard bedrock Depth to soft bedrock	1.00 1.00 0.50	Very limited Slope Depth to hard bedrock Depth to soft bedrock	1.00 1.00 1.00	Very limited Slope Depth to hard bedrock Depth to soft bedrock	1.00 1.00 1.00
CeA: Cartagena-----	85	Very limited Shrink-swell Ponding	1.00 1.00	Very limited Shrink-swell Ponding	1.00 1.00	Very limited Shrink-swell Ponding	1.00 1.00

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Table 14a.--Building Site Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CgD: Casabe-----	90	Very limited Slope Depth to soft bedrock Depth to hard bedrock	1.00 0.50 0.01	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00	Very limited Depth to soft bedrock Slope Depth to hard bedrock	1.00 1.00 0.01
CgF: Casabe-----	90	Very limited Slope Depth to soft bedrock Depth to hard bedrock	1.00 0.50 0.01	Very limited Slope Depth to hard bedrock Depth to soft bedrock	1.00 1.00 1.00	Very limited Slope Depth to soft bedrock Depth to hard bedrock	1.00 1.00 0.01
ChA: Cataño-----	95	Not limited		Not limited		Not limited	
CjD: Cerro Gordo-----	90	Somewhat limited Slope Shrink-swell	0.63 0.50	Somewhat limited Slope Shrink-swell	0.63 0.50	Very limited Slope Shrink-swell	1.00 0.50
CkD: Cerro Mariquita-----	80	Very limited Slope Depth to hard bedrock Shrink-swell Depth to soft bedrock Large stones content	1.00 0.95 0.50 0.50 0.06	Very limited Depth to hard bedrock Depth to soft bedrock Slope Shrink-swell Large stones content	1.00 1.00 1.00 0.50 0.06	Very limited Slope Depth to soft bedrock Depth to hard bedrock Shrink-swell Large stones content	1.00 1.00 0.95 0.50 0.06
CkF: Cerro Mariquita-----	80	Very limited Slope Depth to hard bedrock Shrink-swell Depth to soft bedrock Large stones content	1.00 0.95 0.50 0.50 0.06	Very limited Slope Depth to hard bedrock Depth to soft bedrock Shrink-swell Large stones content	1.00 1.00 1.00 0.50 0.06	Very limited Slope Depth to soft bedrock Depth to hard bedrock Shrink-swell Large stones content	1.00 1.00 0.95 0.50 0.06
CmB: Coamo-----	90	Somewhat limited Shrink-swell Slope	0.78 0.04	Somewhat limited Shrink-swell Slope	0.78 0.04	Very limited Slope Shrink-swell	1.00 0.78
CoA: Coloso-----	90	Very limited Flooding Shrink-swell Depth to saturated zone	1.00 1.00 0.39	Very limited Flooding Depth to saturated zone Shrink-swell	1.00 1.00 1.00	Very limited Flooding Shrink-swell Depth to saturated zone	1.00 1.00 0.39

Soil Survey of San Germán Area, Puerto Rico

Table 14a.--Building Site Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CsE: Consumo-----	80	Very limited Slope Shrink-swell	1.00 0.01	Very limited Slope Shrink-swell	1.00 0.01	Very limited Slope Shrink-swell	1.00 0.01
CsF: Consumo-----	80	Very limited Slope Shrink-swell	1.00 0.01	Very limited Slope Shrink-swell	1.00 0.01	Very limited Slope Shrink-swell	1.00 0.01
CtA: Cortada-----	98	Very limited Flooding	1.00	Very limited Flooding	1.00	Very limited Flooding	1.00
CuD: Costa-----	67	Very limited Slope Depth to soft bedrock	1.00 0.50	Very limited Depth to soft bedrock Slope Depth to hard bedrock	1.00 1.00 0.92	Very limited Depth to soft bedrock Slope	1.00 1.00
Pitahaya-----	25	Somewhat limited Depth to hard bedrock Depth to soft bedrock	0.74 0.50	Very limited Depth to hard bedrock Depth to soft bedrock	1.00 1.00	Somewhat limited Depth to soft bedrock Depth to hard bedrock Slope	1.00 0.74 0.12
CuF: Costa-----	67	Very limited Slope Depth to soft bedrock	1.00 0.50	Very limited Slope Depth to soft bedrock Depth to hard bedrock	1.00 1.00 0.92	Very limited Slope Depth to soft bedrock	1.00 1.00
Pitahaya-----	25	Very limited Slope Depth to hard bedrock Depth to soft bedrock	1.00 0.74 0.50	Very limited Slope Depth to hard bedrock Depth to soft bedrock	1.00 1.00 1.00	Very limited Slope Depth to soft bedrock Depth to hard bedrock	1.00 1.00 0.74
CvF: Cuchillas-----	80	Very limited Slope Shrink-swell Depth to soft bedrock Depth to hard bedrock	1.00 0.50 0.50 0.06	Very limited Slope Depth to hard bedrock Depth to soft bedrock Shrink-swell	1.00 1.00 1.00 1.00 0.50	Very limited Slope Depth to soft bedrock Shrink-swell Depth to hard bedrock	1.00 1.00 0.50 0.06
CvG: Cuchillas-----	80	Very limited Slope Shrink-swell Depth to soft bedrock Depth to hard bedrock	1.00 0.50 0.50 0.06	Very limited Slope Depth to hard bedrock Depth to soft bedrock Shrink-swell	1.00 1.00 1.00 1.00 0.50	Very limited Slope Depth to soft bedrock Shrink-swell Depth to hard bedrock	1.00 1.00 0.50 0.06

Soil Survey of San Germán Area, Puerto Rico

Table 14a.--Building Site Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
DeD: Delicias-----	95	Somewhat limited Slope Shrink-swell	0.84 0.50	Somewhat limited Slope Shrink-swell	0.84 0.50	Very limited Slope Shrink-swell	1.00 0.50
DqA: Dique-----	90	Very limited Flooding	1.00	Very limited Flooding	1.00	Very limited Flooding	1.00
DsC: Descalabrado-----	90	Very limited Depth to hard bedrock Depth to soft bedrock	1.00 0.50	Very limited Depth to hard bedrock Depth to soft bedrock	1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 0.88
DsD: Descalabrado-----	90	Very limited Depth to hard bedrock Slope Depth to soft bedrock	1.00 1.00 0.50	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00	Very limited Slope Depth to hard bedrock Depth to soft bedrock	1.00 1.00 1.00
DsF: Descalabrado-----	90	Very limited Slope Depth to hard bedrock Depth to soft bedrock	1.00 1.00 0.50	Very limited Slope Depth to hard bedrock Depth to soft bedrock	1.00 1.00 1.00	Very limited Slope Depth to hard bedrock Depth to soft bedrock	1.00 1.00 1.00
EcD: El Cacique-----	60	Very limited Depth to hard bedrock Slope Shrink-swell Depth to soft bedrock	1.00 0.84 0.50 0.50	Very limited Depth to hard bedrock Depth to soft bedrock Slope Shrink-swell	1.00 1.00 0.84 0.50	Very limited Depth to hard bedrock Depth to soft bedrock Slope Shrink-swell	1.00 1.00 1.00 0.50
La Taína-----	30	Somewhat limited Slope Depth to hard bedrock Shrink-swell Depth to soft bedrock	0.84 0.54 0.50 0.50	Very limited Depth to hard bedrock Depth to soft bedrock Slope Shrink-swell	1.00 1.00 0.84 0.50	Very limited Depth to soft bedrock Slope Depth to hard bedrock Shrink-swell	1.00 1.00 0.54 0.50
EcF: El Cacique-----	60	Very limited Slope Depth to hard bedrock Shrink-swell Depth to soft bedrock	1.00 1.00 0.50 0.50	Very limited Slope Depth to hard bedrock Depth to soft bedrock Shrink-swell	1.00 1.00 1.00 0.50	Very limited Slope Depth to hard bedrock Depth to soft bedrock Shrink-swell	1.00 1.00 1.00 0.50

Soil Survey of San Germán Area, Puerto Rico

Table 14a.--Building Site Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
EcF: La Taína-----	30	Very limited Slope Depth to hard bedrock Shrink-swell Depth to soft bedrock	1.00 0.54 0.50 0.50	Very limited Slope Depth to hard bedrock Depth to soft bedrock Shrink-swell	1.00 1.00 1.00 1.00 0.50	Very limited Slope Depth to soft bedrock Depth to hard bedrock Shrink-swell	1.00 1.00 0.54 0.50
EcG: El Cacique-----	60	Very limited Slope Depth to hard bedrock Shrink-swell Depth to soft bedrock	1.00 1.00 0.50 0.50	Very limited Slope Depth to hard bedrock Depth to soft bedrock Shrink-swell	1.00 1.00 1.00 1.00 0.50	Very limited Slope Depth to hard bedrock Depth to soft bedrock Shrink-swell	1.00 1.00 1.00 1.00 0.50
La Taína-----	30	Very limited Slope Depth to hard bedrock Shrink-swell Depth to soft bedrock	1.00 0.54 0.50 0.50	Very limited Slope Depth to hard bedrock Depth to soft bedrock Shrink-swell	1.00 1.00 1.00 1.00 0.50	Very limited Slope Depth to soft bedrock Depth to hard bedrock Shrink-swell	1.00 1.00 0.54 0.50
Edd: El Descanso-----	50	Very limited Depth to hard bedrock Organic matter content Slope	1.00 1.00 1.00 0.84	Very limited Depth to hard bedrock Slope	1.00 0.84	Very limited Depth to hard bedrock Slope Organic matter content	1.00 1.00 1.00
Hoconuco-----	45	Somewhat limited Depth to hard bedrock Slope Depth to soft bedrock	0.99 0.84 0.50	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00 0.84	Very limited Depth to soft bedrock Slope Depth to hard bedrock	1.00 1.00 1.00 0.99
EdF: El Descanso-----	50	Very limited Slope Depth to hard bedrock Organic matter content	1.00 1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 1.00	Very limited Slope Depth to hard bedrock Organic matter content	1.00 1.00 1.00
Hoconuco-----	45	Very limited Slope Depth to hard bedrock Depth to soft bedrock	1.00 0.99 0.50	Very limited Slope Depth to hard bedrock Depth to soft bedrock	1.00 1.00 1.00	Very limited Slope Depth to soft bedrock Depth to hard bedrock	1.00 1.00 0.99

Soil Survey of San Germán Area, Puerto Rico

Table 14a.--Building Site Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
EdG: El Descanso-----	50	Very limited Slope Depth to hard bedrock Organic matter content	1.00 1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 1.00	Very limited Slope Depth to hard bedrock Organic matter content	1.00 1.00 1.00
Hoconuco-----	45	Very limited Slope Depth to hard bedrock Depth to soft bedrock	1.00 0.99 0.50	Very limited Slope Depth to hard bedrock Depth to soft bedrock	1.00 1.00 1.00	Very limited Slope Depth to soft bedrock Depth to hard bedrock	1.00 1.00 0.99
EpC: El Papayo-----	95	Very limited Depth to hard bedrock Shrink-swell Depth to soft bedrock	1.00 1.00 0.50	Very limited Shrink-swell Depth to hard bedrock Depth to soft bedrock	1.00 1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Shrink-swell Slope	1.00 1.00 1.00 1.00 0.88
EpD: El Papayo-----	95	Very limited Depth to hard bedrock Shrink-swell Slope Depth to soft bedrock	1.00 1.00 1.00 0.50	Very limited Shrink-swell Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00 1.00	Very limited Slope Depth to hard bedrock Depth to soft bedrock Shrink-swell	1.00 1.00 1.00 1.00
EpF: El Papayo-----	95	Very limited Slope Depth to hard bedrock Shrink-swell Depth to soft bedrock	1.00 1.00 1.00 0.50	Very limited Slope Shrink-swell Depth to hard bedrock Depth to soft bedrock	1.00 1.00 1.00 1.00	Very limited Slope Depth to hard bedrock Depth to soft bedrock Shrink-swell	1.00 1.00 1.00 1.00
FeA: Fé-----	95	Very limited Shrink-swell	1.00	Very limited Shrink-swell Depth to saturated zone	1.00 0.61	Very limited Shrink-swell	1.00
FrA: Fraternidad-----	90	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00
FrB: Fraternidad-----	90	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00
GbF: Guanábano-----	95	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00

Soil Survey of San Germán Area, Puerto Rico

Table 14a.--Building Site Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GhC: Guanajibo-----	90	Not limited		Not limited		Somewhat limited Slope	0.88
GnA: Guánica-----	80	Very limited Ponding Shrink-swell	1.00 1.00	Very limited Ponding Shrink-swell	1.00 1.00	Very limited Ponding Shrink-swell	1.00 1.00
GuB: Guayabo-----	90	Not limited		Not limited		Not limited	
GyB: Guayacán-----	90	Not limited		Not limited		Not limited	
GyC: Guayacán-----	90	Somewhat limited Slope	0.04	Somewhat limited Slope	0.04	Very limited Slope	1.00
GyD: Guayacán-----	90	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00
HmD: Humatas-----	80	Very limited Shrink-swell Slope	1.00 1.00	Very limited Shrink-swell Slope	1.00 1.00	Very limited Slope Shrink-swell	1.00 1.00
HmE: Humatas-----	80	Very limited Slope Shrink-swell	1.00 1.00	Very limited Slope Shrink-swell	1.00 1.00	Very limited Slope Shrink-swell	1.00 1.00
HmF: Humatas-----	80	Very limited Slope Shrink-swell	1.00 1.00	Very limited Slope Shrink-swell	1.00 1.00	Very limited Slope Shrink-swell	1.00 1.00
JaB: Jácana-----	80	Very limited Shrink-swell	1.00	Very limited Shrink-swell Depth to soft bedrock	1.00 0.20	Very limited Shrink-swell	1.00
JaC: Jácana-----	80	Very limited Shrink-swell Slope	1.00 0.04	Very limited Shrink-swell Depth to soft bedrock Slope	1.00 0.20 0.04	Very limited Shrink-swell Slope	1.00 1.00
JBA: Joyuda-----	50	Very limited Subsidence Flooding Depth to saturated zone Organic matter content	1.00 1.00 1.00 1.00	Very limited Subsidence Flooding Depth to saturated zone Organic matter content	1.00 1.00 1.00 1.00	Very limited Subsidence Flooding Depth to saturated zone Organic matter content	1.00 1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 14a.--Building Site Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
JBA: Atolladero-----	30	Very limited Flooding Depth to saturated zone	1.00 0.98	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 0.98
Bajura-----	20	Very limited Flooding Depth to saturated zone Shrink-swell	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone Shrink-swell	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone Shrink-swell	1.00 1.00 1.00
LcE: La Covana-----	60	Very limited Slope Shrink-swell Depth to thin cemented pan	1.00 0.50 0.50	Very limited Depth to thin cemented pan Slope Shrink-swell	1.00 1.00 0.50	Very limited Slope Depth to thin cemented pan Shrink-swell	1.00 1.00 0.50
Limestone outcrop---	20	Not rated		Not rated		Not rated	
Seboruco-----	15	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00
LdA: La Luna-----	90	Very limited Flooding	1.00	Very limited Flooding	1.00	Very limited Flooding	1.00
LeF: La Tea-----	70	Very limited Slope Depth to hard bedrock Depth to soft bedrock	1.00 1.00 0.50	Very limited Slope Depth to hard bedrock Depth to soft bedrock	1.00 1.00 1.00	Very limited Slope Depth to hard bedrock Depth to soft bedrock	1.00 1.00 1.00
LfC: Landfill-----	100	Not rated		Not rated		Not rated	
LkB: Lares-----	80	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50
LnA: Llanos Costa-----	75	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50
LnB: Llanos Costa-----	75	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50
LnC: Llanos Costa-----	75	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50	Somewhat limited Slope Shrink-swell	0.88 0.50

Soil Survey of San Germán Area, Puerto Rico

Table 14a.--Building Site Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LpG: Los Peñones-----	60	Very limited Slope Organic matter content Depth to hard bedrock	1.00 1.00 1.00	Very limited Slope Organic matter content Depth to hard bedrock	1.00 1.00 1.00	Very limited Slope Organic matter content Depth to hard bedrock	1.00 1.00 1.00
Limestone outcrop---	40	Not rated		Not rated		Not rated	
MaB: Mabí-----	70	Very limited Flooding Shrink-swell Depth to saturated zone	1.00 1.00 0.98	Very limited Flooding Depth to saturated zone Shrink-swell	1.00 1.00 1.00	Very limited Flooding Shrink-swell Depth to saturated zone	1.00 1.00 0.98
MbA: Maguayo-----	80	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00
MbC: Maguayo-----	80	Very limited Shrink-swell Slope	1.00 0.01	Very limited Shrink-swell Slope	1.00 0.01	Very limited Shrink-swell Slope	1.00 1.00
McF: Malaya-----	90	Very limited Slope Shrink-swell Depth to soft bedrock	1.00 1.00 0.50	Very limited Slope Shrink-swell Depth to soft bedrock	1.00 1.00 1.00	Very limited Slope Depth to soft bedrock Shrink-swell	1.00 1.00 1.00
MDA: Manglillo-----	50	Very limited Flooding Depth to saturated zone Shrink-swell	1.00 1.00 0.22	Very limited Flooding Depth to saturated zone Shrink-swell	1.00 1.00 0.22	Very limited Flooding Depth to saturated zone Shrink-swell	1.00 1.00 0.22
Boquerón-----	30	Very limited Flooding Depth to saturated zone Shrink-swell	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone Shrink-swell	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone Shrink-swell	1.00 1.00 1.00
Serrano-----	20	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00
MeA: Maní-----	80	Very limited Flooding Shrink-swell Depth to saturated zone	1.00 1.00 0.39	Very limited Flooding Depth to saturated zone Shrink-swell	1.00 1.00 0.50	Very limited Flooding Shrink-swell Depth to saturated zone	1.00 1.00 0.39

Soil Survey of San Germán Area, Puerto Rico

Table 14a.--Building Site Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MfF: Maresúa-----	80	Very limited Slope Shrink-swell	1.00 0.06	Very limited Slope Depth to soft bedrock Depth to hard bedrock Shrink-swell	1.00 0.79 0.77 0.06	Very limited Slope Shrink-swell	1.00 0.06
MgF: Maresúa-----	40	Very limited Slope Shrink-swell	1.00 0.06	Very limited Slope Depth to soft bedrock Depth to hard bedrock Shrink-swell	1.00 0.79 0.77 0.06	Very limited Slope Shrink-swell	1.00 0.06
Serpentine outcrop-----	40	Not rated		Not rated		Not rated	
MiD: Mariana-----	95	Very limited Slope Shrink-swell	1.00 0.50	Very limited Slope Shrink-swell	1.00 0.50	Very limited Slope Shrink-swell	1.00 0.50
MiE: Mariana-----	95	Very limited Slope Shrink-swell	1.00 0.50	Very limited Slope Shrink-swell	1.00 0.50	Very limited Slope Shrink-swell	1.00 0.50
MkF: Maricao-----	80	Very limited Slope Shrink-swell	1.00 0.11	Very limited Slope Shrink-swell	1.00 0.11	Very limited Slope Shrink-swell	1.00 0.11
MkG: Maricao-----	80	Very limited Slope Shrink-swell	1.00 0.11	Very limited Slope Shrink-swell	1.00 0.11	Very limited Slope Shrink-swell	1.00 0.11
MnA: Melones-----	95	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00
MnC: Melones-----	95	Very limited Shrink-swell Slope	1.00 0.04	Very limited Shrink-swell Slope	1.00 0.04	Very limited Shrink-swell Slope	1.00 1.00
MoB: Montalva-----	80	Very limited Shrink-swell	1.00	Very limited Shrink-swell Depth to soft bedrock	1.00 0.29	Very limited Shrink-swell	1.00

Soil Survey of San Germán Area, Puerto Rico

Table 14a.--Building Site Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MoC: Montalva-----	80	Very limited Shrink-swell Slope	1.00 0.04	Very limited Shrink-swell Depth to soft bedrock Slope	1.00 0.29 0.04	Very limited Shrink-swell Slope	1.00 1.00
MqC: Montegrando-----	90	Very limited Shrink-swell	1.00	Very limited Shrink-swell Depth to saturated zone	1.00 0.99	Very limited Shrink-swell Slope	1.00 0.88
MrD: Morado-----	85	Very limited Slope Depth to hard bedrock	1.00 0.35	Very limited Depth to hard bedrock Slope Depth to soft bedrock	1.00 1.00 0.99	Very limited Slope Depth to hard bedrock	1.00 0.35
MrE: Morado-----	85	Very limited Slope Depth to hard bedrock	1.00 0.35	Very limited Slope Depth to hard bedrock Depth to soft bedrock	1.00 1.00 0.99	Very limited Slope Depth to hard bedrock	1.00 0.35
MrF: Morado-----	85	Very limited Slope Depth to hard bedrock	1.00 0.35	Very limited Slope Depth to hard bedrock Depth to soft bedrock	1.00 1.00 0.99	Very limited Slope Depth to hard bedrock	1.00 0.35
MuC: Múcara-----	80	Somewhat limited Shrink-swell Slope	0.50 0.04	Somewhat limited Shrink-swell Depth to soft bedrock Slope	0.50 0.29 0.04	Very limited Slope Shrink-swell	1.00 0.50
MuD: Múcara-----	80	Very limited Slope Shrink-swell	1.00 0.50	Very limited Slope Shrink-swell Depth to soft bedrock	1.00 0.50 0.29	Very limited Slope Shrink-swell	1.00 0.50
MuE: Múcara-----	80	Very limited Slope Shrink-swell	1.00 0.50	Very limited Slope Shrink-swell Depth to soft bedrock	1.00 0.50 0.29	Very limited Slope Shrink-swell	1.00 0.50

Soil Survey of San Germán Area, Puerto Rico

Table 14a.--Building Site Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MuF: Múcara-----	80	Very limited Slope Shrink-swell	1.00 0.50	Very limited Slope Shrink-swell Depth to soft bedrock	1.00 0.50 0.29	Very limited Slope Shrink-swell	1.00 0.50
NpD: Nipe-----	95	Somewhat limited Slope	0.84	Somewhat limited Slope	0.84	Very limited Slope	1.00
OrA: Olivares-----	95	Very limited Ponding Shrink-swell	1.00 0.50	Very limited Ponding Shrink-swell	1.00 0.50	Very limited Ponding Shrink-swell	1.00 0.50
PaA: Palmarejo-----	90	Somewhat limited Shrink-swell	0.11	Somewhat limited Shrink-swell	0.11	Somewhat limited Shrink-swell	0.11
PaB: Palmarejo-----	90	Somewhat limited Shrink-swell	0.11	Somewhat limited Shrink-swell	0.11	Somewhat limited Shrink-swell	0.11
PaC: Palmarejo-----	90	Somewhat limited Shrink-swell Slope	0.11 0.01	Somewhat limited Shrink-swell Slope	0.11 0.01	Very limited Slope Shrink-swell	1.00 0.11
PgA: Parguera-----	80	Not limited		Not limited		Not limited	
PgB: Parguera-----	80	Not limited		Not limited		Not limited	
PsF: Pitahaya-----	60	Very limited Slope Depth to hard bedrock Depth to soft bedrock	1.00 0.74 0.50	Very limited Slope Depth to hard bedrock Depth to soft bedrock	1.00 1.00 1.00	Very limited Slope Depth to soft bedrock Depth to hard bedrock	1.00 1.00 0.74
Limestone outcrop---	20	Not rated		Not rated		Not rated	
Seboruco-----	15	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00
PsG: Pitahaya-----	60	Very limited Slope Depth to hard bedrock Depth to soft bedrock	1.00 0.74 0.50	Very limited Slope Depth to hard bedrock Depth to soft bedrock	1.00 1.00 1.00	Very limited Slope Depth to soft bedrock Depth to hard bedrock	1.00 1.00 0.74
Limestone outcrop---	20	Not rated		Not rated		Not rated	
Seboruco-----	15	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00

Soil Survey of San Germán Area, Puerto Rico

Table 14a.--Building Site Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Pt: Pits and quarries---	100	Not rated		Not rated		Not rated	
PzB: Pozo Blanco-----	95	Very limited Large stones content	1.00	Very limited Large stones content	1.00	Very limited Large stones content	1.00
PzC: Pozo Blanco-----	95	Very limited Large stones content Slope	1.00 0.04	Very limited Large stones content Slope	1.00 0.04	Very limited Large stones content Slope	1.00 1.00
PzD: Pozo Blanco-----	95	Very limited Large stones content Slope	1.00 1.00	Very limited Large stones content Slope	1.00 1.00	Very limited Slope Large stones content	1.00 1.00
QbD: Quebrada-----	95	Very limited Shrink-swell Slope Depth to soft bedrock	1.00 1.00 0.50	Very limited Shrink-swell Depth to soft bedrock Slope	1.00 1.00 1.00	Very limited Slope Depth to soft bedrock Shrink-swell	1.00 1.00 1.00
QbE: Quebrada-----	95	Very limited Slope Shrink-swell Depth to soft bedrock	1.00 1.00 0.50	Very limited Slope Shrink-swell Depth to soft bedrock	1.00 1.00 1.00	Very limited Slope Depth to soft bedrock Shrink-swell	1.00 1.00 1.00
QbF: Quebrada-----	95	Very limited Slope Shrink-swell Depth to soft bedrock	1.00 1.00 0.50	Very limited Slope Shrink-swell Depth to soft bedrock	1.00 1.00 1.00	Very limited Slope Depth to soft bedrock Shrink-swell	1.00 1.00 1.00
ReA: Reilly-----	95	Very limited Flooding	1.00	Very limited Flooding Depth to saturated zone	1.00 0.99	Very limited Flooding	1.00
RoD: Rosario-----	80	Very limited Slope Shrink-swell	1.00 0.50	Very limited Slope Depth to hard bedrock Shrink-swell Depth to soft bedrock	1.00 0.88 0.50 0.29	Very limited Slope Shrink-swell	1.00 0.50

Soil Survey of San Germán Area, Puerto Rico

Table 14a.--Building Site Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
RoE: Rosario-----	80	Very limited Slope Shrink-swell	1.00 0.50	Very limited Slope Depth to hard bedrock Shrink-swell Depth to soft bedrock	1.00 0.88 0.50 0.29	Very limited Slope Shrink-swell	1.00 0.50
RoF: Rosario-----	80	Very limited Slope Shrink-swell	1.00 0.50	Very limited Slope Depth to hard bedrock Shrink-swell Depth to soft bedrock	1.00 0.88 0.50 0.29	Very limited Slope Shrink-swell	1.00 0.50
RuF: Rubias-----	60	Very limited Slope Shrink-swell	1.00 0.50	Very limited Slope Depth to soft bedrock Shrink-swell Depth to hard bedrock	1.00 0.86 0.50 0.42	Very limited Slope Shrink-swell	1.00 0.50
Chiquito-----	30	Very limited Slope Depth to hard bedrock	1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 1.00
RuG: Rubias-----	60	Very limited Slope Shrink-swell	1.00 0.50	Very limited Slope Depth to soft bedrock Shrink-swell Depth to hard bedrock	1.00 0.86 0.50 0.42	Very limited Slope Shrink-swell	1.00 0.50
Chiquito-----	30	Very limited Slope Depth to hard bedrock	1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 1.00
Sa: Salt flats, ponded---	100	Not rated		Not rated		Not rated	
Sb: Salt pits-----	100	Not rated		Not rated		Not rated	
ScA: San Antón-----	95	Very limited Flooding Shrink-swell	1.00 0.01	Very limited Flooding	1.00	Very limited Flooding Shrink-swell	1.00 0.01

Soil Survey of San Germán Area, Puerto Rico

Table 14a.--Building Site Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
SdD: San Germán-----	95	Very limited Depth to hard bedrock Slope	1.00 0.84	Very limited Depth to hard bedrock Slope	1.00 0.84	Very limited Depth to hard bedrock Slope	1.00 1.00
SdF: San Germán-----	95	Very limited Slope Depth to hard bedrock	1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 1.00
SgD: San Germán-----	60	Very limited Depth to hard bedrock Slope	1.00 0.84	Very limited Depth to hard bedrock Slope	1.00 0.84	Very limited Depth to hard bedrock Slope	1.00 1.00
Duey-----	40	Somewhat limited Slope	0.84	Very limited Depth to hard bedrock	1.00	Very limited Depth to soft bedrock	1.00
		Depth to soft bedrock	0.50	Depth to soft bedrock	1.00	Slope	1.00
		Depth to hard bedrock	0.10	Slope	0.84	Depth to hard bedrock	0.10
SgF: San Germán-----	60	Very limited Slope Depth to hard bedrock	1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 1.00
Duey-----	40	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00
		Depth to soft bedrock	0.50	Depth to hard bedrock	1.00	Depth to soft bedrock	1.00
		Depth to hard bedrock	0.10	Depth to soft bedrock	1.00	Depth to hard bedrock	0.10
SiA: Santa Isabel-----	95	Very limited Shrink-swell	1.00	Very limited Shrink-swell Depth to saturated zone	1.00 0.05	Very limited Shrink-swell	1.00
SmE: Santa Marta-----	95	Very limited Slope	1.00	Very limited Slope Depth to soft bedrock Depth to hard bedrock	1.00 0.03 0.02	Very limited Slope	1.00
SoC: Seboruco-----	90	Not limited		Not limited		Somewhat limited Slope	0.88
SsB: Sosa-----	90	Not limited		Not limited		Not limited	

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Table 14a.--Building Site Development (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
SsC: Sosa-----	90	Somewhat limited Slope	0.01	Somewhat limited Slope	0.01	Very limited Slope	1.00
TeA: Teresa-----	95	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00
TfA: Teresa, ponded-----	95	Very limited Shrink-swell Ponding	1.00 1.00	Very limited Shrink-swell Ponding	1.00 1.00	Very limited Shrink-swell Ponding	1.00 1.00
ToA: Toa-----	90	Very limited Flooding Shrink-swell	1.00 0.02	Very limited Flooding Shrink-swell	1.00 0.02	Very limited Flooding Shrink-swell	1.00 0.02
Ua: Urban land-----	100	Not rated		Not rated		Not rated	
UbB: Urban land-----	85	Not rated		Not rated		Not rated	
Bahía-----	10	Not limited		Not limited		Not limited	
UgB: Urban land-----	85	Not rated		Not rated		Not rated	
Guayabo-----	10	Not limited		Not limited		Not limited	
Usc: Urban land-----	80	Not rated		Not rated		Not rated	
Sosa-----	15	Somewhat limited Slope	0.01	Somewhat limited Slope	0.01	Very limited Slope	1.00
VaA: Vayas-----	90	Very limited Flooding Depth to saturated zone Shrink-swell	1.00 1.00 0.50	Very limited Flooding Depth to saturated zone Shrink-swell	1.00 1.00 0.50	Very limited Flooding Depth to saturated zone Shrink-swell	1.00 1.00 0.50
VoC: Voladora-----	90	Somewhat limited Shrink-swell Slope	0.50 0.04	Somewhat limited Shrink-swell Slope	0.50 0.04	Very limited Slope Shrink-swell	1.00 0.50
VoD: Voladora-----	90	Very limited Slope Shrink-swell	1.00 0.50	Very limited Slope Shrink-swell	1.00 0.50	Very limited Slope Shrink-swell	1.00 0.50
W: Water-----	100	Not rated		Not rated		Not rated	

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Table 14b.--Building Site Development (Part 2)

[The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table]

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AbF: Agüeybaná-----	85	Very limited Slope Low strength Shrink-swell	1.00 1.00 0.78	Very limited Slope Too clayey Cutbanks cave	1.00 0.88 0.10	Very limited Slope Too clayey	1.00 1.00
AgD: Aguilita-----	90	Somewhat limited Slope Shrink-swell	0.84 0.22	Somewhat limited Slope Cutbanks cave	0.84 0.10	Very limited Carbonate content Sodium content Slope Gravel content	1.00 1.00 0.84 0.46
AgF: Aguilita-----	80	Very limited Slope Shrink-swell	1.00 0.22	Very limited Slope Cutbanks cave	1.00 0.10	Very limited Slope Carbonate content Sodium content Gravel content	1.00 1.00 1.00 0.46
AkA: Aguirre-----	95	Very limited Shrink-swell Ponding Low strength	1.00 1.00 1.00	Very limited Ponding Too clayey Cutbanks cave	1.00 1.00 1.00	Very limited Too clayey Ponding	1.00 1.00
AlF: Aljibe-----	40	Very limited Slope Low strength	1.00 1.00	Very limited Slope Depth to hard bedrock Too clayey Cutbanks cave Depth to soft bedrock	1.00 0.71 0.12 0.10 0.10	Very limited Slope Depth to bedrock	1.00 0.10
Guamá-----	30	Very limited Slope Low strength Shrink-swell	1.00 1.00 0.50	Very limited Slope Too clayey Cutbanks cave	1.00 1.00 0.10	Very limited Slope	1.00
Indiera-----	25	Very limited Slope Low strength	1.00 1.00	Very limited Slope Too clayey Cutbanks cave	1.00 1.00 0.10	Very limited Slope	1.00
AtD: Altamira-----	85	Somewhat limited Shrink-swell Slope	0.99 0.01	Very limited Cutbanks cave Slope	1.00 0.01	Very limited Carbonate content Too clayey Gravel content Slope	1.00 1.00 0.38 0.01

Soil Survey of San Germán Area, Puerto Rico

Table 14b.--Building Site Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AtF: Altamira-----	85	Very limited Slope Shrink-swell	1.00 0.99	Very limited Slope Cutbanks cave	1.00 1.00	Very limited Slope Carbonate content Too clayey Gravel content	1.00 1.00 1.00 0.38
BaB: Bahía-----	90	Not limited		Very limited Cutbanks cave	1.00	Somewhat limited Droughty	0.01
BhB: Bahía Salinas-----	90	Not limited		Very limited Cutbanks cave	1.00	Very limited Salinity Droughty Too sandy Large stones content	1.00 1.00 0.50 0.08
BjA: Bajura-----	90	Very limited Shrink-swell Depth to saturated zone Flooding Low strength	1.00 1.00 1.00 1.00	Very limited Depth to saturated zone Too clayey Flooding Cutbanks cave	1.00 1.00 0.80 0.10	Very limited Flooding Depth to saturated zone Too clayey	1.00 1.00 1.00
BkB: Beaches-----	100	Not rated		Not rated		Not rated	
BmC: Bermeja-----	70	Somewhat limited Depth to soft bedrock Large stones content Depth to hard bedrock Shrink-swell Slope	1.00 0.74 0.74 0.50 0.01	Very limited Depth to hard bedrock Depth to soft bedrock Large stones content Slope	1.00 1.00 0.74 0.01	Very limited Large stones content Droughty Depth to bedrock Slope	1.00 1.00 1.00 0.01
Cerro Mariquita-----	20	Somewhat limited Depth to soft bedrock Depth to hard bedrock Shrink-swell Large stones content Slope	1.00 0.95 0.50 0.06 0.01	Very limited Depth to hard bedrock Depth to soft bedrock Large stones content Slope	1.00 1.00 1.00 0.06 0.01	Very limited Depth to bedrock Droughty Gravel content Slope	1.00 1.00 0.63 0.01
BmD: Bermeja-----	70	Very limited Depth to soft bedrock Slope Large stones content Depth to hard bedrock Shrink-swell	1.00 1.00 0.74 0.74 0.50	Very limited Depth to hard bedrock Depth to soft bedrock Slope Large stones content	1.00 1.00 1.00 0.74	Very limited Large stones content Droughty Depth to bedrock Slope	1.00 1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 14b.--Building Site Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BmD: Cerro Mariquita-----	20	Very limited Depth to soft bedrock Slope Depth to hard bedrock Shrink-swell Large stones content	1.00 1.00 0.95 0.50 0.06	Very limited Depth to hard bedrock Depth to soft bedrock Slope Large stones content	1.00 1.00 1.00 1.00 0.06	Very limited Depth to bedrock Droughty Slope Gravel content	1.00 1.00 1.00 0.63
BmF: Bermeja-----	75	Very limited Slope Depth to soft bedrock Large stones content Depth to hard bedrock Shrink-swell	1.00 1.00 0.74 0.74 0.50	Very limited Depth to hard bedrock Depth to soft bedrock Slope Large stones content	1.00 1.00 1.00 1.00 0.74	Very limited Slope Large stones content Droughty Depth to bedrock	1.00 1.00 1.00 1.00
Cerro Mariquita-----	20	Very limited Slope Depth to soft bedrock Depth to hard bedrock Shrink-swell Large stones content	1.00 1.00 0.95 0.50 0.06	Very limited Depth to hard bedrock Depth to soft bedrock Slope Large stones content	1.00 1.00 1.00 1.00 0.06	Very limited Depth to bedrock Slope Droughty Gravel content	1.00 1.00 1.00 0.63
BrF: Bermeja-----	75	Very limited Slope Depth to soft bedrock Large stones content Depth to hard bedrock Shrink-swell	1.00 1.00 0.74 0.74 0.50	Very limited Depth to hard bedrock Depth to soft bedrock Slope Large stones content	1.00 1.00 1.00 1.00 0.74	Very limited Slope Large stones content Droughty Depth to bedrock	1.00 1.00 1.00 1.00
Rock outcrop-----	15	Not rated		Not rated		Not rated	
CaC: Cabo Rojo-----	90	Very limited Low strength Shrink-swell	1.00 0.50	Very limited Too clayey Cutbanks cave	1.00 0.10	Not limited	
CbD: Caguabo-----	85	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00	Very limited Droughty Depth to bedrock Slope Gravel content	1.00 1.00 1.00 0.88

Soil Survey of San Germán Area, Puerto Rico

Table 14b.--Building Site Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CbF: Caguabo-----	85	Very limited Depth to hard bedrock Slope Depth to soft bedrock	1.00 1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00	Very limited Slope Droughty Depth to bedrock Gravel content	1.00 1.00 1.00 0.88
CeA: Cartagena-----	85	Very limited Shrink-swell Low strength Ponding	1.00 1.00 1.00	Very limited Cutbanks cave Too clayey Ponding	1.00 1.00 1.00	Very limited Too clayey Sodium content Ponding Salinity	1.00 1.00 1.00 0.50
CgD: Casabe-----	90	Very limited Depth to soft bedrock Slope Depth to hard bedrock	1.00 1.00 0.01	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00	Very limited Depth to bedrock Droughty Too clayey Slope	1.00 1.00 1.00 1.00
CgF: Casabe-----	90	Very limited Slope Depth to soft bedrock Depth to hard bedrock	1.00 1.00 0.01	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00	Very limited Depth to bedrock Slope Droughty Too clayey	1.00 1.00 1.00 1.00
ChA: Cataño-----	95	Not limited		Very limited Cutbanks cave	1.00	Very limited Too sandy Droughty	1.00 0.63
CjD: Cerro Gordo-----	90	Somewhat limited Slope Shrink-swell	0.63 0.50	Very limited Cutbanks cave Slope	1.00 0.63	Somewhat limited Slope	0.63
CkD: Cerro Mariquita----	80	Very limited Depth to soft bedrock Slope Depth to hard bedrock Shrink-swell Large stones content	1.00 1.00 0.95 0.50 0.06	Very limited Depth to hard bedrock Depth to soft bedrock Slope Large stones content	1.00 1.00 1.00 0.06	Very limited Depth to bedrock Droughty Slope Gravel content	1.00 1.00 1.00 0.63
CkF: Cerro Mariquita----	80	Very limited Slope Depth to soft bedrock Depth to hard bedrock Shrink-swell Large stones content	1.00 1.00 0.95 0.50 0.06	Very limited Depth to hard bedrock Depth to soft bedrock Slope Large stones content	1.00 1.00 1.00 0.06	Very limited Depth to bedrock Slope Droughty Gravel content	1.00 1.00 1.00 0.63

Soil Survey of San Germán Area, Puerto Rico

Table 14b.--Building Site Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CmB: Coamo-----	90	Very limited Low strength Shrink-swell Slope	1.00 0.78 0.04	Very limited Cutbanks cave Slope	1.00 0.04	Somewhat limited Slope	0.04
CoA: Coloso-----	90	Very limited Shrink-swell Flooding Low strength Depth to saturated zone	1.00 1.00 1.00 0.19	Very limited Depth to saturated zone Too clayey Flooding Cutbanks cave	1.00 1.00 0.60 0.10	Very limited Too clayey Flooding Depth to saturated zone	1.00 0.60 0.19
CsE: Consumo-----	80	Very limited Slope Low strength Shrink-swell	1.00 1.00 0.01	Very limited Slope Too clayey Cutbanks cave	1.00 1.00 0.10	Very limited Slope	1.00
CsF: Consumo-----	80	Very limited Slope Low strength Shrink-swell	1.00 1.00 0.01	Very limited Slope Too clayey Cutbanks cave	1.00 1.00 0.10	Very limited Slope	1.00
CtA: Cortada-----	98	Very limited Flooding Low strength	1.00 1.00	Somewhat limited Flooding Cutbanks cave	0.60 0.10	Somewhat limited Flooding	0.60
CuD: Costa-----	67	Very limited Depth to soft bedrock Low strength Slope	1.00 1.00 1.00	Very limited Depth to soft bedrock Slope Depth to hard bedrock	1.00 1.00 0.92	Very limited Droughty Carbonate content Depth to bedrock Too clayey Slope	1.00 1.00 1.00 1.00 1.00
Pitahaya-----	25	Somewhat limited Depth to soft bedrock Depth to hard bedrock	1.00 0.74	Very limited Depth to hard bedrock Depth to soft bedrock	1.00 1.00	Very limited Droughty Carbonate content Depth to bedrock Too clayey	1.00 1.00 1.00 1.00
CuF: Costa-----	67	Very limited Slope Depth to soft bedrock Low strength	1.00 1.00 1.00	Very limited Depth to soft bedrock Slope Depth to hard bedrock	1.00 1.00 0.92	Very limited Slope Droughty Carbonate content Depth to bedrock Too clayey	1.00 1.00 1.00 1.00 1.00
Pitahaya-----	25	Very limited Slope Depth to soft bedrock Depth to hard bedrock	1.00 1.00 0.74	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00 1.00	Very limited Slope Droughty Carbonate content Depth to bedrock Too clayey	1.00 1.00 1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 14b.--Building Site Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CvF: Cuchillas-----	80	Very limited Slope Depth to soft bedrock Low strength Shrink-swell Depth to hard bedrock	1.00 1.00 1.00 0.50 0.06	Very limited Depth to hard bedrock Depth to soft bedrock Slope Cutbanks cave	1.00 1.00 1.00 1.00 0.10	Very limited Slope Depth to bedrock Droughty	1.00 1.00 0.67
CvG: Cuchillas-----	80	Very limited Slope Depth to soft bedrock Low strength Shrink-swell Depth to hard bedrock	1.00 1.00 1.00 0.50 0.06	Very limited Depth to hard bedrock Depth to soft bedrock Slope Cutbanks cave	1.00 1.00 1.00 1.00 0.10	Very limited Slope Depth to bedrock Droughty	1.00 1.00 0.67
DeD: Delicias-----	95	Very limited Low strength Slope Shrink-swell	1.00 0.84 0.50	Very limited Too clayey Slope Cutbanks cave	1.00 0.84 0.10	Very limited Too clayey Slope	1.00 0.84
DqA: Dique-----	90	Very limited Flooding Low strength	1.00 1.00	Somewhat limited Flooding Cutbanks cave	0.80 0.10	Very limited Flooding	1.00
DsC: Descalabrado-----	90	Very limited Depth to hard bedrock Depth to soft bedrock	1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock	1.00 1.00	Very limited Depth to bedrock Droughty Too clayey Gravel content	1.00 1.00 1.00 0.01
DsD: Descalabrado-----	90	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00	Very limited Depth to bedrock Droughty Slope Too clayey Gravel content	1.00 1.00 1.00 1.00 0.01
DsF: Descalabrado-----	90	Very limited Depth to hard bedrock Slope Depth to soft bedrock	1.00 1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00	Very limited Depth to bedrock Slope Droughty Too clayey Gravel content	1.00 1.00 1.00 1.00 0.01

Soil Survey of San Germán Area, Puerto Rico

Table 14b.--Building Site Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
EcD:							
El Cacique-----	60	Very limited Depth to hard bedrock Depth to soft bedrock Low strength Slope Shrink-swell	1.00 1.00 1.00 0.84 0.50	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 0.84	Very limited Depth to bedrock Droughty Slope	1.00 1.00 0.84
La Taína-----	30	Somewhat limited Depth to soft bedrock Slope Depth to hard bedrock Shrink-swell	1.00 0.84 0.54 0.50	Very limited Depth to hard bedrock Depth to soft bedrock Slope Cutbanks cave	1.00 1.00 0.84 0.10	Very limited Depth to bedrock Too clayey Gravel content Slope Droughty	1.00 1.00 1.00 0.84 0.69
EcF:							
El Cacique-----	60	Very limited Depth to hard bedrock Slope Depth to soft bedrock Low strength Shrink-swell	1.00 1.00 1.00 1.00 0.50	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00	Very limited Depth to bedrock Slope Droughty	1.00 1.00 1.00
La Taína-----	30	Very limited Slope Depth to soft bedrock Depth to hard bedrock Shrink-swell	1.00 1.00 0.54 0.50	Very limited Depth to hard bedrock Depth to soft bedrock Slope Cutbanks cave	1.00 1.00 1.00 0.10	Very limited Slope Depth to bedrock Too clayey Gravel content Droughty	1.00 1.00 1.00 1.00 0.69
EcG:							
El Cacique-----	60	Very limited Depth to hard bedrock Slope Depth to soft bedrock Low strength Shrink-swell	1.00 1.00 1.00 1.00 0.50	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00	Very limited Depth to bedrock Slope Droughty	1.00 1.00 1.00
La Taína-----	30	Very limited Slope Depth to soft bedrock Depth to hard bedrock Shrink-swell	1.00 1.00 0.54 0.50	Very limited Depth to hard bedrock Depth to soft bedrock Slope Cutbanks cave	1.00 1.00 1.00 0.10	Very limited Slope Depth to bedrock Too clayey Gravel content Droughty	1.00 1.00 1.00 1.00 0.69

Soil Survey of San Germán Area, Puerto Rico

Table 14b.--Building Site Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
EdD:							
El Descanso-----	50	Very limited Depth to hard bedrock Slope	1.00 0.84	Very limited Depth to hard bedrock Slope	1.00 0.84	Very limited Depth to bedrock Slope Droughty	1.00 0.84 0.83
Hoconuco-----	45	Very limited Depth to soft bedrock Low strength Depth to hard bedrock Slope	1.00 1.00 1.00 0.99 0.84	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00 0.84	Very limited Droughty Depth to bedrock Large stones content Slope	1.00 1.00 1.00 0.84
EdF:							
El Descanso-----	50	Very limited Depth to hard bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Slope	1.00 1.00	Very limited Depth to bedrock Slope Droughty	1.00 1.00 0.83
Hoconuco-----	45	Very limited Slope Depth to soft bedrock Low strength Depth to hard bedrock	1.00 1.00 1.00 0.99	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00	Very limited Slope Droughty Depth to bedrock Large stones content	1.00 1.00 1.00 1.00
EdG:							
El Descanso-----	50	Very limited Depth to hard bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Slope	1.00 1.00	Very limited Depth to bedrock Slope Droughty	1.00 1.00 0.83
Hoconuco-----	45	Very limited Slope Depth to soft bedrock Low strength Depth to hard bedrock	1.00 1.00 1.00 0.99	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00	Very limited Slope Droughty Depth to bedrock Large stones content	1.00 1.00 1.00 1.00
EpC:							
El Papayo-----	95	Very limited Depth to hard bedrock Depth to soft bedrock Shrink-swell Low strength	1.00 1.00 1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock	1.00 1.00	Very limited Depth to bedrock Droughty Gravel content	1.00 1.00 0.61
EpD:							
El Papayo-----	95	Very limited Depth to hard bedrock Depth to soft bedrock Shrink-swell Slope Low strength	1.00 1.00 1.00 1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00	Very limited Depth to bedrock Droughty Slope Gravel content	1.00 1.00 1.00 0.61

Soil Survey of San Germán Area, Puerto Rico

Table 14b.--Building Site Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
EpF: El Papayo-----	95	Very limited Depth to hard bedrock Slope Depth to soft bedrock Shrink-swell Low strength	1.00 1.00 1.00 1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00 1.00	Very limited Depth to bedrock Slope Droughty Gravel content	1.00 1.00 1.00 0.61
FeA: Fé-----	95	Very limited Shrink-swell Low strength	1.00 1.00	Very limited Cutbanks cave Too clayey Depth to saturated zone	1.00 0.88 0.61	Very limited Too clayey Sodium content Salinity	1.00 1.00 0.50
FrA: Fraternidad-----	90	Very limited Shrink-swell	1.00	Very limited Cutbanks cave Too clayey	1.00 1.00	Very limited Too clayey	1.00
FrB: Fraternidad-----	90	Very limited Shrink-swell	1.00	Very limited Cutbanks cave Too clayey	1.00 1.00	Very limited Too clayey	1.00
GbF: Guanábano-----	95	Very limited Slope	1.00	Very limited Slope Cutbanks cave Too clayey	1.00 1.00 0.98	Very limited Slope Too clayey Large stones content	1.00 1.00 0.26
GhC: Guanajibo-----	90	Very limited Low strength	1.00	Very limited Too clayey Cutbanks cave	1.00 0.10	Somewhat limited Droughty	0.97
GnA: Guánica-----	80	Very limited Shrink-swell Ponding Low strength	1.00 1.00 1.00	Very limited Ponding Too clayey Cutbanks cave	1.00 1.00 1.00	Very limited Too clayey Ponding Sodium content	1.00 1.00 1.00
GuB: Guayabo-----	90	Not limited		Very limited Cutbanks cave	1.00	Somewhat limited Droughty Too sandy	0.69 0.50
GyB: Guayacán-----	90	Not limited		Very limited Cutbanks cave Too clayey	1.00 0.01	Very limited Too clayey	1.00
GyC: Guayacán-----	90	Somewhat limited Slope	0.04	Very limited Cutbanks cave Slope Too clayey	1.00 0.04 0.01	Very limited Too clayey Slope	1.00 0.04

Soil Survey of San Germán Area, Puerto Rico

Table 14b.--Building Site Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GyD: Guayacán-----	90	Very limited Slope	1.00	Very limited Cutbanks cave Slope Too clayey	1.00 1.00 0.01	Very limited Slope Too clayey	1.00 1.00
HmD: Humatas-----	80	Very limited Low strength Shrink-swell Slope	1.00 1.00 1.00	Very limited Too clayey Slope Cutbanks cave	1.00 1.00 0.10	Very limited Slope Too clayey	1.00 1.00
HmE: Humatas-----	80	Very limited Slope Low strength Shrink-swell	1.00 1.00 1.00	Very limited Slope Too clayey Cutbanks cave	1.00 1.00 0.10	Very limited Slope Too clayey	1.00 1.00
HmF: Humatas-----	80	Very limited Slope Low strength Shrink-swell	1.00 1.00 1.00	Very limited Slope Too clayey Cutbanks cave	1.00 1.00 0.10	Very limited Slope Too clayey	1.00 1.00
JaB: Jácana-----	80	Very limited Low strength Shrink-swell	1.00 1.00	Somewhat limited Too clayey Depth to soft bedrock Cutbanks cave	0.72 0.20 0.10	Very limited Too clayey Depth to bedrock	1.00 0.20
JaC: Jácana-----	80	Very limited Low strength Shrink-swell Slope	1.00 1.00 0.04	Somewhat limited Too clayey Depth to soft bedrock Cutbanks cave Slope	0.72 0.20 0.10 0.04	Very limited Too clayey Depth to bedrock Slope	1.00 0.20 0.04
JBA: Joyuda-----	50	Very limited Depth to saturated zone Subsidence Flooding	1.00 1.00 1.00	Very limited Depth to saturated zone Organic matter content Flooding	1.00 1.00 0.80	Very limited Flooding Depth to saturated zone	1.00 1.00
Atolladero-----	30	Very limited Flooding Depth to saturated zone	1.00 0.75	Very limited Depth to saturated zone Cutbanks cave Flooding	1.00 1.00 0.80	Very limited Flooding Depth to saturated zone Salinity Droughty	1.00 0.75 0.50 0.48
Bajura-----	20	Very limited Shrink-swell Depth to saturated zone Flooding Low strength	1.00 1.00 1.00 1.00	Very limited Depth to saturated zone Too clayey Flooding Cutbanks cave	1.00 1.00 0.80 0.10	Very limited Flooding Depth to saturated zone Too clayey	1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 14b.--Building Site Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LcE:							
La Covana-----	60	Very limited Depth to thin cemented pan Slope Shrink-swell	1.00 1.00 0.50	Very limited Depth to thin cemented pan Slope Cutbanks cave	1.00 1.00 0.10	Very limited Depth to cemented pan Droughty Carbonate content Slope Too clayey	1.00 1.00 1.00 1.00 1.00
Limestone outcrop---	20	Not rated		Not rated		Not rated	
Seboruco-----	15	Very limited Slope	1.00	Very limited Slope Cutbanks cave	1.00 0.10	Very limited Carbonate content Slope Droughty	1.00 1.00 0.84
LdA:							
La Luna-----	90	Very limited Flooding Low strength	1.00 1.00	Somewhat limited Flooding Cutbanks cave	0.60 0.10	Somewhat limited Flooding	0.60
LeF:							
La Tea-----	70	Very limited Depth to hard bedrock Slope Depth to soft bedrock Low strength	1.00 1.00 1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00	Very limited Too clayey Depth to bedrock Slope Droughty Large stones content	1.00 1.00 1.00 1.00 0.97
LfC:							
Landfill-----	100	Not rated		Not rated		Not rated	
LkB:							
Lares-----	80	Very limited Low strength Shrink-swell	1.00 0.50	Very limited Too clayey Cutbanks cave	1.00 0.10	Very limited Too clayey	1.00
LnA:							
Llanos Costa-----	75	Very limited Low strength Shrink-swell	1.00 0.50	Very limited Cutbanks cave Too clayey	1.00 0.41	Not limited	
LnB:							
Llanos Costa-----	75	Very limited Low strength Shrink-swell	1.00 0.50	Very limited Cutbanks cave Too clayey	1.00 0.41	Not limited	
LnC:							
Llanos Costa-----	75	Very limited Low strength Shrink-swell	1.00 0.50	Very limited Cutbanks cave Too clayey	1.00 0.41	Not limited	
LpG:							
Los Peñones-----	60	Very limited Depth to hard bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Slope	1.00 1.00	Very limited Depth to bedrock Slope Droughty	1.00 1.00 1.00
Limestone outcrop---	40	Not rated		Not rated		Not rated	

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Table 14b.--Building Site Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MaB: Mabí-----	70	Very limited Shrink-swell Low strength Depth to saturated zone Flooding	1.00 1.00 0.75 0.40	Very limited Depth to saturated zone Cutbanks cave Too clayey	1.00 1.00 0.97	Very limited Too clayey Depth to saturated zone	1.00 0.75
MbA: Maguayo-----	80	Very limited Low strength Shrink-swell	1.00 1.00	Somewhat limited Too clayey Cutbanks cave	0.40 0.10	Somewhat limited Gravel content	0.38
MbC: Maguayo-----	80	Very limited Low strength Shrink-swell Slope	1.00 1.00 0.01	Somewhat limited Too clayey Cutbanks cave Slope	0.40 0.10 0.01	Somewhat limited Gravel content Slope	0.38 0.01
McF: Malaya-----	90	Very limited Slope Depth to soft bedrock Shrink-swell	1.00 1.00 1.00	Very limited Depth to soft bedrock Slope Cutbanks cave	1.00 1.00 0.10	Very limited Too clayey Depth to bedrock Slope Droughty	1.00 1.00 1.00 1.00
MDA: Manglillo-----	50	Very limited Depth to saturated zone Flooding Low strength Shrink-swell	1.00 1.00 1.00 0.22	Very limited Depth to saturated zone Organic matter content Flooding Cutbanks cave	1.00 1.00 0.80 0.10	Very limited Flooding Depth to saturated zone	1.00 1.00
Boquerón-----	30	Very limited Depth to saturated zone Flooding Low strength Shrink-swell	1.00 1.00 1.00 1.00	Very limited Depth to saturated zone Too clayey Flooding Cutbanks cave	1.00 1.00 0.80 0.10	Very limited Flooding Depth to saturated zone	1.00 1.00
Serrano-----	20	Very limited Depth to saturated zone Flooding	1.00 1.00	Very limited Depth to saturated zone Cutbanks cave Flooding	1.00 1.00 0.80	Very limited Flooding Sodium content Depth to saturated zone Droughty Salinity	1.00 1.00 1.00 0.96 0.50
MeA: Maní-----	80	Very limited Flooding Low strength Shrink-swell Depth to saturated zone	1.00 1.00 1.00 0.19	Very limited Depth to saturated zone Flooding Too clayey Cutbanks cave	1.00 0.60 0.50 0.10	Very limited Too clayey Flooding Depth to saturated zone	1.00 0.60 0.19

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Table 14b.--Building Site Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MfF: Maresúa-----	80	Very limited Slope Shrink-swell	1.00 0.06	Very limited Slope Depth to soft bedrock Depth to hard bedrock Cutbanks cave Too clayey	1.00 0.79 0.77 0.10 0.04	Very limited Slope Depth to bedrock Droughty	1.00 0.80 0.15
MgF: Maresúa-----	40	Very limited Slope Shrink-swell	1.00 0.06	Very limited Slope Depth to soft bedrock Depth to hard bedrock Cutbanks cave Too clayey	1.00 0.79 0.77 0.10 0.04	Very limited Slope Depth to bedrock Droughty	1.00 0.80 0.15
Serpentine outcrop-----	40	Not rated		Not rated		Not rated	
MiD: Mariana-----	95	Very limited Low strength Slope Shrink-swell	1.00 1.00 0.50	Very limited Slope Too clayey Cutbanks cave	1.00 0.81 0.10	Very limited Slope Gravel content	1.00 0.01
MiE: Mariana-----	95	Very limited Slope Low strength Shrink-swell	1.00 1.00 0.50	Very limited Slope Too clayey Cutbanks cave	1.00 0.81 0.10	Very limited Slope Gravel content	1.00 0.01
MkF: Maricao-----	80	Very limited Slope Low strength Shrink-swell	1.00 1.00 0.11	Very limited Slope Too clayey Cutbanks cave	1.00 1.00 0.10	Very limited Slope Too clayey Large stones content	1.00 1.00 0.01
MkG: Maricao-----	80	Very limited Slope Low strength Shrink-swell	1.00 1.00 0.11	Very limited Slope Too clayey Cutbanks cave	1.00 1.00 0.10	Very limited Slope Too clayey Large stones content	1.00 1.00 0.01
MnA: Melones-----	95	Very limited Shrink-swell Low strength	1.00 1.00	Very limited Cutbanks cave Too clayey	1.00 0.65	Very limited Sodium content Too clayey	1.00 1.00
MnC: Melones-----	95	Very limited Shrink-swell Low strength Slope	1.00 1.00 0.04	Very limited Cutbanks cave Too clayey Slope	1.00 0.65 0.04	Very limited Sodium content Too clayey Slope	1.00 1.00 0.04

Soil Survey of San Germán Area, Puerto Rico

Table 14b.--Building Site Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MoB: Montalva-----	80	Very limited Low strength Shrink-swell	1.00 1.00	Very limited Cutbanks cave Too clayey Depth to soft bedrock	1.00 0.50 0.29	Very limited Too clayey Depth to bedrock	1.00 0.29
MoC: Montalva-----	80	Very limited Low strength Shrink-swell Slope	1.00 1.00 0.04	Very limited Cutbanks cave Too clayey Depth to soft bedrock Slope	1.00 0.50 0.29 0.04	Very limited Too clayey Depth to bedrock Slope	1.00 0.29 0.04
MqC: Montegrando-----	90	Very limited Shrink-swell	1.00	Very limited Cutbanks cave Too clayey Depth to saturated zone	1.00 1.00 0.99	Very limited Too clayey	1.00
MrD: Morado-----	85	Very limited Low strength Slope Depth to hard bedrock	1.00 1.00 0.35	Very limited Depth to hard bedrock Slope Depth to soft bedrock Cutbanks cave	1.00 1.00 0.99 0.10	Very limited Slope Depth to bedrock Droughty	1.00 0.99 0.16
MrE: Morado-----	85	Very limited Slope Low strength Depth to hard bedrock	1.00 1.00 0.35	Very limited Depth to hard bedrock Slope Depth to soft bedrock Cutbanks cave	1.00 1.00 0.99 0.10	Very limited Slope Depth to bedrock Droughty	1.00 0.99 0.16
MrF: Morado-----	85	Very limited Slope Low strength Depth to hard bedrock	1.00 1.00 0.35	Very limited Depth to hard bedrock Slope Depth to soft bedrock Cutbanks cave	1.00 1.00 0.99 0.10	Very limited Slope Depth to bedrock Droughty	1.00 0.99 0.16
MuC: Múcara-----	80	Somewhat limited Shrink-swell Slope	0.50 0.04	Very limited Cutbanks cave Depth to soft bedrock Slope	1.00 0.29 0.04	Somewhat limited Depth to bedrock Droughty Slope	0.29 0.25 0.04
MuD: Múcara-----	80	Very limited Slope Shrink-swell	1.00 0.50	Very limited Cutbanks cave Slope Depth to soft bedrock	1.00 1.00 0.29	Very limited Slope Depth to bedrock Droughty	1.00 0.29 0.25

Soil Survey of San Germán Area, Puerto Rico

Table 14b.--Building Site Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MuE: Múcara-----	80	Very limited Slope Shrink-swell	1.00 0.50	Very limited Slope Cutbanks cave Depth to soft bedrock	1.00 1.00 0.29	Very limited Slope Depth to bedrock Droughty	1.00 0.29 0.25
MuF: Múcara-----	80	Very limited Slope Shrink-swell	1.00 0.50	Very limited Slope Cutbanks cave Depth to soft bedrock	1.00 1.00 0.29	Very limited Slope Depth to bedrock Droughty	1.00 0.29 0.25
NpD: Nipe-----	95	Very limited Low strength Slope	1.00 0.84	Somewhat limited Slope Too clayey Cutbanks cave	0.84 0.36 0.10	Somewhat limited Slope	0.84
OrA: Olivares-----	95	Very limited Ponding Low strength Shrink-swell	1.00 1.00 0.50	Very limited Ponding Too clayey Cutbanks cave	1.00 0.50 0.10	Very limited Ponding Droughty	1.00 0.52
PaA: Palmarejo-----	90	Very limited Low strength Shrink-swell	1.00 0.11	Somewhat limited Too clayey Cutbanks cave	0.60 0.10	Not limited	
PaB: Palmarejo-----	90	Very limited Low strength Shrink-swell	1.00 0.11	Somewhat limited Too clayey Cutbanks cave	0.60 0.10	Not limited	
PaC: Palmarejo-----	90	Very limited Low strength Shrink-swell Slope	1.00 0.11 0.01	Somewhat limited Too clayey Cutbanks cave Slope	0.60 0.10 0.01	Somewhat limited Slope	0.01
PgA: Parguera-----	80	Very limited Low strength	1.00	Very limited Cutbanks cave Too clayey	1.00 0.66	Very limited Sodium content Carbonate content Too clayey	1.00 1.00 1.00
PgB: Parguera-----	80	Very limited Low strength	1.00	Very limited Cutbanks cave Too clayey	1.00 0.66	Very limited Sodium content Carbonate content Too clayey	1.00 1.00 1.00
PsF: Pitahaya-----	60	Very limited Slope Depth to soft bedrock Depth to hard bedrock	1.00 1.00 0.74	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00 1.00	Very limited Slope Droughty Carbonate content Depth to bedrock Too clayey	1.00 1.00 1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 14b.--Building Site Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
PsF: Limestone outcrop---	20	Not rated		Not rated		Not rated	
Seboruco-----	15	Very limited Slope	1.00	Very limited Slope Cutbanks cave	1.00 0.10	Very limited Slope Carbonate content Droughty	1.00 1.00 0.84
PsG: Pitahaya-----	60	Very limited Slope Depth to soft bedrock Depth to hard bedrock	1.00 1.00 0.74	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00 1.00	Very limited Slope Droughty Carbonate content Depth to bedrock Too clayey	1.00 1.00 1.00 1.00 1.00
Limestone outcrop---	20	Not rated		Not rated		Not rated	
Seboruco-----	15	Very limited Slope	1.00	Very limited Slope Cutbanks cave	1.00 0.10	Very limited Slope Carbonate content Droughty	1.00 1.00 0.84
Pt: Pits and quarries---	100	Not rated		Not rated		Not rated	
PzB: Pozo Blanco-----	95	Very limited Large stones content Low strength	1.00 0.78	Very limited Large stones content Cutbanks cave Too clayey	1.00 1.00 0.27	Very limited Large stones content Too clayey Carbonate content	1.00 1.00 1.00
PzC: Pozo Blanco-----	95	Very limited Large stones content Low strength Slope	1.00 0.78 0.04	Very limited Large stones content Cutbanks cave Too clayey Slope	1.00 1.00 0.27 0.04	Very limited Large stones content Too clayey Carbonate content Slope	1.00 1.00 1.00 1.00 0.04
PzD: Pozo Blanco-----	95	Very limited Large stones content Slope Low strength	1.00 1.00 0.78	Very limited Large stones content Cutbanks cave Slope Too clayey	1.00 1.00 1.00 0.27	Very limited Large stones content Slope Too clayey Carbonate content	1.00 1.00 1.00 1.00
Qbd: Quebrada-----	95	Very limited Depth to soft bedrock Low strength Shrink-swell Slope	1.00 1.00 1.00 1.00	Very limited Depth to soft bedrock Slope Cutbanks cave	1.00 1.00 1.00 0.10	Very limited Depth to bedrock Slope Droughty	1.00 1.00 0.16

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Table 14b.--Building Site Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
QbE: Quebrada-----	95	Very limited Slope Depth to soft bedrock Low strength Shrink-swell	1.00 1.00 1.00 1.00	Very limited Depth to soft bedrock Slope Cutbanks cave	1.00 1.00 1.00 0.10	Very limited Depth to bedrock Slope Droughty	1.00 1.00 0.16
QbF: Quebrada-----	95	Very limited Slope Depth to soft bedrock Low strength Shrink-swell	1.00 1.00 1.00 1.00	Very limited Depth to soft bedrock Slope Cutbanks cave	1.00 1.00 1.00 0.10	Very limited Depth to bedrock Slope Droughty	1.00 1.00 0.16
ReA: Reilly-----	95	Very limited Flooding	1.00	Very limited Cutbanks cave Depth to saturated zone Flooding	1.00 0.99 0.80	Very limited Flooding Droughty Gravel content	1.00 1.00 0.82
RoD: Rosario-----	80	Very limited Low strength Slope Shrink-swell	1.00 1.00 0.50	Very limited Slope Depth to hard bedrock Depth to soft bedrock Cutbanks cave	1.00 0.88 0.29 0.10	Very limited Slope Depth to bedrock	1.00 0.29
RoE: Rosario-----	80	Very limited Slope Low strength Shrink-swell	1.00 1.00 0.50	Very limited Slope Depth to hard bedrock Depth to soft bedrock Cutbanks cave	1.00 0.88 0.29 0.10	Very limited Slope Depth to bedrock	1.00 0.29
RoF: Rosario-----	80	Very limited Slope Low strength Shrink-swell	1.00 1.00 0.50	Very limited Slope Depth to hard bedrock Depth to soft bedrock Cutbanks cave	1.00 0.88 0.29 0.10	Very limited Slope Depth to bedrock	1.00 0.29
RuF: Rubias-----	60	Very limited Slope Shrink-swell	1.00 0.50	Very limited Slope Depth to soft bedrock Depth to hard bedrock Cutbanks cave	1.00 0.86 0.42 0.10	Very limited Slope Depth to bedrock	1.00 0.86

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Table 14b.--Building Site Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
RuF: Chiquito-----	30	Very limited Depth to hard bedrock Slope Low strength	1.00 1.00 1.00	Very limited Depth to hard bedrock Slope Cutbanks cave	1.00 1.00 0.10	Very limited Depth to bedrock Slope Gravel content Droughty	1.00 1.00 0.88 0.35
RuG: Rubias-----	60	Very limited Slope Shrink-swell	1.00 0.50	Very limited Slope Depth to soft bedrock Depth to hard bedrock Cutbanks cave	1.00 0.86 0.42 0.10	Very limited Slope Depth to bedrock	1.00 0.86
Chiquito-----	30	Very limited Depth to hard bedrock Slope Low strength	1.00 1.00 1.00	Very limited Depth to hard bedrock Slope Cutbanks cave	1.00 1.00 0.10	Very limited Depth to bedrock Slope Gravel content Droughty	1.00 1.00 0.88 0.35
Sa: Salt flats, ponded---	100	Not rated		Not rated		Not rated	
Sb: Salt pits-----	100	Not rated		Not rated		Not rated	
SCA: San Antón-----	95	Very limited Flooding Shrink-swell	1.00 0.01	Somewhat limited Flooding Cutbanks cave	0.60 0.10	Somewhat limited Flooding	0.60
SdD: San Germán-----	95	Very limited Depth to hard bedrock Slope	1.00 0.84	Very limited Depth to hard bedrock Slope Cutbanks cave	1.00 0.84 0.10	Very limited Droughty Depth to bedrock Carbonate content Slope Large stones content	1.00 1.00 1.00 0.84 0.20
SdF: San Germán-----	95	Very limited Depth to hard bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Slope Cutbanks cave	1.00 1.00 0.10	Very limited Slope Droughty Depth to bedrock Carbonate content Large stones content	1.00 1.00 1.00 1.00 0.20
SgD: San Germán-----	60	Very limited Depth to hard bedrock Slope	1.00 0.84	Very limited Depth to hard bedrock Slope Cutbanks cave	1.00 0.84 0.10	Very limited Droughty Depth to bedrock Carbonate content Slope Large stones content	1.00 1.00 1.00 0.84 0.20

Soil Survey of San Germán Area, Puerto Rico

Table 14b.--Building Site Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
SgD: Duey-----	40	Somewhat limited Depth to soft bedrock Slope Depth to hard bedrock	1.00 0.84 0.10	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 0.84	Very limited Droughty Depth to bedrock Carbonate content Slope	1.00 1.00 1.00 0.84
SgF: San Germán-----	60	Very limited Depth to hard bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Slope Cutbanks cave	1.00 1.00 0.10	Very limited Slope Droughty Depth to bedrock Carbonate content Large stones content	1.00 1.00 1.00 1.00 0.20
Duey-----	40	Very limited Slope Depth to soft bedrock Depth to hard bedrock	1.00 1.00 0.10	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00	Very limited Slope Droughty Depth to bedrock Carbonate content	1.00 1.00 1.00 1.00
SiA: Santa Isabel-----	95	Very limited Shrink-swell Low strength	1.00 1.00	Very limited Cutbanks cave Too clayey Depth to saturated zone	1.00 0.83 0.05	Very limited Too clayey	1.00
SmE: Santa Marta-----	95	Very limited Slope Low strength	1.00 1.00	Very limited Slope Cutbanks cave Depth to soft bedrock Too clayey Depth to hard bedrock	1.00 0.10 0.03 0.02 0.02	Very limited Slope Depth to bedrock	1.00 0.03
SoC: Seboruco-----	90	Not limited		Somewhat limited Cutbanks cave	0.10	Very limited Carbonate content Droughty	1.00 0.84
SsB: Sosa-----	90	Somewhat limited Low strength	0.10	Somewhat limited Dense layer Cutbanks cave Too clayey	0.50 0.10 0.06	Somewhat limited Droughty	0.10
SsC: Sosa-----	90	Somewhat limited Low strength Slope	0.10 0.01	Somewhat limited Dense layer Cutbanks cave Too clayey Slope	0.50 0.10 0.06 0.01	Somewhat limited Droughty Slope	0.10 0.01

Soil Survey of San Germán Area, Puerto Rico

Table 14b.--Building Site Development (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
TeA: Teresa-----	95	Very limited Low strength Shrink-swell	1.00 1.00	Very limited Cutbanks cave Too clayey	1.00 1.00	Very limited Too clayey	1.00
TfA: Teresa, ponded-----	95	Very limited Low strength Shrink-swell Ponding	1.00 1.00 1.00	Very limited Cutbanks cave Too clayey Ponding	1.00 1.00 1.00	Very limited Too clayey Ponding	1.00 1.00
ToA: Toa-----	90	Very limited Flooding Low strength Shrink-swell	1.00 1.00 0.02	Somewhat limited Flooding Cutbanks cave Too clayey	0.60 0.10 0.01	Somewhat limited Flooding	0.60
Ua: Urban land-----	100	Not rated		Not rated		Not rated	
UbB: Urban land-----	85	Not rated		Not rated		Not rated	
Bahía-----	10	Not limited		Very limited Cutbanks cave	1.00	Somewhat limited Droughty	0.01
UgB: Urban land-----	85	Not rated		Not rated		Not rated	
Guayabo-----	10	Not limited		Very limited Cutbanks cave	1.00	Somewhat limited Droughty Too sandy	0.69 0.50
UsC: Urban land-----	80	Not rated		Not rated		Not rated	
Sosa-----	15	Somewhat limited Low strength Slope	0.10 0.01	Somewhat limited Dense layer Cutbanks cave Too clayey Slope	0.50 0.10 0.06 0.01	Somewhat limited Droughty Slope	0.10 0.01
VaA: Vayas-----	90	Very limited Depth to saturated zone Flooding Low strength Shrink-swell	1.00 1.00 1.00 0.50	Very limited Depth to saturated zone Flooding Cutbanks cave	1.00 0.60 0.10	Very limited Depth to saturated zone Flooding	1.00 0.60
VoC: Voladora-----	90	Very limited Low strength Shrink-swell Slope	1.00 0.50 0.04	Somewhat limited Too clayey Cutbanks cave Slope	0.50 0.10 0.04	Very limited Too clayey Slope	1.00 0.04
VoD: Voladora-----	90	Very limited Low strength Slope Shrink-swell	1.00 1.00 0.50	Very limited Slope Too clayey Cutbanks cave	1.00 0.50 0.10	Very limited Too clayey Slope	1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 15a.--Sanitary Facilities (Part 1)

[The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table]

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
AbF: Agüeybaná-----	85	Very limited Slow water movement Slope	1.00 1.00	Very limited Slope Seepage	1.00 0.02
AgD: Aguilita-----	90	Somewhat limited Slope Depth to bedrock Slow water movement	0.84 0.59 0.50	Very limited Slope Seepage Depth to soft bedrock	1.00 0.50 0.13
AgF: Aguilita-----	80	Very limited Slope Depth to bedrock Slow water movement	1.00 0.59 0.50	Very limited Slope Seepage Depth to soft bedrock	1.00 0.50 0.13
AkA: Aguirre-----	95	Very limited Slow water movement Ponding	1.00 1.00	Very limited Ponding	1.00
AlF: Aljibe-----	40	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 0.98	Very limited Depth to soft bedrock Slope Organic matter content Depth to hard bedrock Seepage	1.00 1.00 1.00 0.71 0.02
Guamá-----	30	Very limited Slope Slow water movement	1.00 0.98	Very limited Slope Organic matter content Seepage	1.00 1.00 0.02
Indiera-----	25	Very limited Slope Slow water movement Depth to bedrock	1.00 0.98 0.89	Very limited Slope Organic matter content Depth to soft bedrock Seepage	1.00 1.00 0.71 0.02

Soil Survey of San Germán Area, Puerto Rico

Table 15a.--Sanitary Facilities (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
AtD: Altamira-----	85	Somewhat limited Slow water movement Depth to bedrock Slope	0.98 0.59 0.01	Very limited Seepage Slope Depth to soft bedrock	1.00 1.00 0.13
AtF: Altamira-----	85	Very limited Slope Slow water movement Depth to bedrock	1.00 0.98 0.59	Very limited Slope Seepage Depth to soft bedrock	1.00 1.00 0.13
BaB: Bahía-----	90	Very limited Filtering capacity	1.00	Very limited Seepage Slope	1.00 0.08
BhB: Bahía Salinas-----	90	Very limited Filtering capacity	1.00	Very limited Seepage	1.00
BjA: Bajura-----	90	Very limited Flooding Slow water movement Depth to saturated zone	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00
BkB: Beaches-----	100	Not rated		Not rated	
BmC: Bermeja-----	70	Very limited Depth to bedrock Large stones content Slope	1.00 0.74 0.01	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00
Cerro Mariquita-----	20	Very limited Depth to bedrock Large stones content Slope	1.00 0.06 0.01	Very limited Depth to hard bedrock Depth to soft bedrock Slope Seepage	1.00 1.00 1.00 0.02
BmD: Bermeja-----	70	Very limited Depth to bedrock Slope Large stones content	1.00 1.00 0.74	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 15a.--Sanitary Facilities (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
BmD: Cerro Mariquita-----	20	Very limited Depth to bedrock Slope Large stones content	1.00 1.00 0.06	Very limited Depth to hard bedrock Depth to soft bedrock Slope Seepage	1.00 1.00 1.00 0.02
BmF: Bermeja-----	75	Very limited Depth to bedrock Slope Large stones content	1.00 1.00 0.74	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00
Cerro Mariquita-----	20	Very limited Depth to bedrock Slope Large stones content	1.00 1.00 0.06	Very limited Depth to hard bedrock Depth to soft bedrock Slope Seepage	1.00 1.00 1.00 0.02
BrF: Bermeja-----	75	Very limited Depth to bedrock Slope Large stones content	1.00 1.00 0.74	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00
Rock outcrop-----	15	Not rated		Not rated	
CaC: Cabo Rojo-----	90	Very limited Slow water movement	1.00	Very limited Slope	1.00
CbD: Caguabo-----	85	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00
CbF: Caguabo-----	85	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00
CeA: Cartagena-----	85	Very limited Slow water movement Ponding	1.00 1.00	Very limited Ponding	1.00

Soil Survey of San Germán Area, Puerto Rico

Table 15a.--Sanitary Facilities (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
CgD: Casabe-----	90	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00
CgF: Casabe-----	90	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00
ChA: Cataño-----	95	Very limited Filtering capacity Seepage, bottom layer	1.00 1.00	Very limited Seepage	1.00
CjD: Cerro Gordo-----	90	Very limited Filtering capacity Seepage, bottom layer Slope	1.00 1.00 1.00 0.63	Very limited Seepage Slope Organic matter content	1.00 1.00 1.00
CkD: Cerro Mariquita-----	80	Very limited Depth to bedrock Slope Large stones content	1.00 1.00 0.06	Very limited Depth to hard bedrock Depth to soft bedrock Slope Seepage	1.00 1.00 1.00 0.02
CkF: Cerro Mariquita-----	80	Very limited Depth to bedrock Slope Large stones content	1.00 1.00 0.06	Very limited Depth to hard bedrock Depth to soft bedrock Slope Seepage	1.00 1.00 1.00 0.02
CmB: Coamo-----	90	Very limited Seepage, bottom layer Slow water movement Slope	1.00 0.50 0.04	Very limited Slope Seepage	1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 15a.--Sanitary Facilities (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
CoA: Coloso-----	90	Very limited Flooding Slow water movement Depth to saturated zone	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00
CsE: Consumo-----	80	Very limited Slope Slow water movement	1.00 0.50	Very limited Slope Seepage	1.00 0.50
CsF: Consumo-----	80	Very limited Slope Slow water movement	1.00 0.50	Very limited Slope Seepage	1.00 0.50
CtA: Cortada-----	98	Very limited Flooding Slow water movement	1.00 0.95	Very limited Flooding Seepage	1.00 1.00
CuD: Costa-----	67	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to soft bedrock Slope Depth to hard bedrock	1.00 1.00 0.92
Pitahaya-----	25	Very limited Depth to bedrock	1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 0.68
CuF: Costa-----	67	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to soft bedrock Slope Depth to hard bedrock	1.00 1.00 0.92
Pitahaya-----	25	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 15a.--Sanitary Facilities (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
CvF: Cuchillas-----	80	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope Seepage	1.00 1.00 1.00 0.02
CvG: Cuchillas-----	80	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope Seepage	1.00 1.00 1.00 0.02
DeD: Delicias-----	95	Somewhat limited Slope Slow water movement	0.84 0.50	Very limited Slope Seepage	1.00 0.50
DqA: Dique-----	90	Very limited Flooding Slow water movement	1.00 0.50	Very limited Flooding Seepage	1.00 0.50
DsC: Descalabrado-----	90	Very limited Depth to bedrock	1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00
DsD: Descalabrado-----	90	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00
DsF: Descalabrado-----	90	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00
EcD: El Cacique-----	60	Very limited Depth to bedrock Slope	1.00 0.84	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 15a.--Sanitary Facilities (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
EcD: La Taína-----	30	Very limited Depth to bedrock Slope	1.00 0.84	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00
EcF: El Cacique-----	60	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00
La Taína-----	30	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00
EcG: El Cacique-----	60	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00
La Taína-----	30	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00
EdD: El Descanso-----	50	Very limited Depth to bedrock Slope	1.00 0.84	Very limited Depth to hard bedrock Slope Organic matter content Seepage	1.00 1.00 1.00 1.00 0.02
Hoconuco-----	45	Very limited Depth to bedrock Slope	1.00 0.84	Very limited Depth to hard bedrock Depth to soft bedrock Slope Organic matter content	1.00 1.00 1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 15a.--Sanitary Facilities (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
EdF: El Descanso-----	50	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Slope Organic matter content Seepage	1.00 1.00 1.00 0.02
Hoconuco-----	45	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope Organic matter content	1.00 1.00 1.00 1.00
EdG: El Descanso-----	50	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Slope Organic matter content Seepage	1.00 1.00 1.00 0.02
Hoconuco-----	45	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope Organic matter content	1.00 1.00 1.00 1.00
EpC: El Papayo-----	95	Very limited Depth to bedrock	1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00
EpD: El Papayo-----	95	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00
EpF: El Papayo-----	95	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 15a.--Sanitary Facilities (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
FeA: Fé-----	95	Very limited Slow water movement Depth to saturated zone	1.00 0.99	Somewhat limited Depth to saturated zone	0.71
FrA: Fraternidad-----	90	Very limited Slow water movement	1.00	Not limited	
FrB: Fraternidad-----	90	Very limited Slow water movement	1.00	Somewhat limited Slope	0.08
GbF: Guanábano-----	95	Very limited Slope Seepage, bottom layer	1.00 1.00	Very limited Slope Seepage	1.00 1.00
GhC: Guanajibo-----	90	Not limited		Very limited Slope	1.00
GnA: Guánica-----	80	Very limited Slow water movement Ponding	1.00 1.00	Very limited Ponding	1.00
GuB: Guayabo-----	90	Very limited Filtering capacity	1.00	Very limited Seepage Slope	1.00 0.08
GyB: Guayacán-----	90	Very limited Slow water movement	1.00	Somewhat limited Seepage	0.02
GyC: Guayacán-----	90	Very limited Slow water movement Slope	1.00 0.04	Very limited Slope Seepage	1.00 0.02
GyD: Guayacán-----	90	Very limited Slow water movement Slope	1.00 1.00	Very limited Slope Seepage	1.00 0.02
HmD: Humatas-----	80	Very limited Slow water movement Slope	1.00 1.00	Very limited Slope	1.00

Soil Survey of San Germán Area, Puerto Rico

Table 15a.--Sanitary Facilities (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
HmE: Humatas-----	80	Very limited Slow water movement Slope	1.00 1.00	Very limited Slope	1.00
HmF: Humatas-----	80	Very limited Slow water movement Slope	1.00 1.00	Very limited Slope	1.00
JaB: Jácana-----	80	Very limited Slow water movement Depth to bedrock	1.00 1.00	Very limited Depth to soft bedrock Slope	1.00 0.32
JaC: Jácana-----	80	Very limited Slow water movement Depth to bedrock Slope	1.00 1.00 0.04	Very limited Depth to soft bedrock Slope	1.00 1.00
JBA: Joyuda-----	50	Very limited Flooding Depth to saturated zone Subsidence Seepage, bottom layer Filtering capacity	1.00 1.00 1.00 1.00 1.00	Very limited Flooding Organic matter content Seepage Depth to saturated zone	1.00 1.00 1.00 1.00
Atolladero-----	30	Very limited Flooding Depth to saturated zone Seepage, bottom layer Filtering capacity	1.00 1.00 1.00 1.00	Very limited Flooding Seepage Depth to saturated zone Organic matter content	1.00 1.00 1.00 1.00
Bajura-----	20	Very limited Flooding Slow water movement Depth to saturated zone	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00
LcE: La Covana-----	60	Very limited Depth to cemented pan Slope	1.00 1.00	Very limited Depth to cemented pan Slope Seepage	1.00 1.00 0.02
Limestone outcrop---	20	Not rated		Not rated	

Soil Survey of San Germán Area, Puerto Rico

Table 15a.--Sanitary Facilities (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
LcE: Seboruco-----	15	Very limited Slope Slow water movement	1.00 0.98	Very limited Slope Seepage	1.00 0.02
LdA: La Luna-----	90	Very limited Flooding Slow water movement	1.00 1.00	Very limited Flooding	1.00
LeF: La Tea-----	70	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00
LfC: Landfill-----	100	Not rated		Not rated	
LkB: Lares-----	80	Very limited Slow water movement	1.00	Somewhat limited Seepage Slope	0.50 0.08
LnA: Llanos Costa-----	75	Very limited Slow water movement	1.00	Somewhat limited Seepage	0.02
LnB: Llanos Costa-----	75	Very limited Slow water movement	1.00	Somewhat limited Slope Seepage	0.08 0.02
LnC: Llanos Costa-----	75	Very limited Slow water movement	1.00	Very limited Slope Seepage	1.00 0.02
LpG: Los Peñones-----	60	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Organic matter content Slope	1.00 1.00 1.00
Limestone outcrop---	40	Not rated		Not rated	
MaB: Mabí-----	70	Very limited Slow water movement Depth to saturated zone Flooding	1.00 1.00 0.40	Very limited Depth to saturated zone Flooding	1.00 0.40

Soil Survey of San Germán Area, Puerto Rico

Table 15a.--Sanitary Facilities (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
MbA: Maguayo-----	80	Very limited Slow water movement	1.00	Not limited	
MbC: Maguayo-----	80	Very limited Slow water movement Slope	1.00 0.01	Very limited Slope	1.00
McF: Malaya-----	90	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to soft bedrock Slope	1.00 1.00
MDA: Manglillo-----	50	Very limited Flooding Slow water movement Depth to saturated zone	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone Organic matter content Seepage	1.00 1.00 1.00 0.50
Boquerón-----	30	Very limited Flooding Slow water movement Depth to saturated zone	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone Organic matter content	1.00 1.00 1.00
Serrano-----	20	Very limited Flooding Depth to saturated zone Filtering capacity Seepage, bottom layer	1.00 1.00 1.00 1.00	Very limited Flooding Depth to saturated zone Seepage	1.00 1.00 1.00
MeA: Maní-----	80	Very limited Flooding Slow water movement Depth to saturated zone	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00
MFF: Maresúa-----	80	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 0.50	Very limited Depth to soft bedrock Slope Organic matter content Depth to hard bedrock Seepage	1.00 1.00 1.00 0.77 0.50

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Table 15a.--Sanitary Facilities (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
MgF: Maresúa-----	40	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 0.50	Very limited Depth to soft bedrock Slope Organic matter content Depth to hard bedrock Seepage	1.00 1.00 1.00 0.77 0.50
Serpentinite outcrop-----	40	Not rated		Not rated	
MiD: Mariana-----	95	Very limited Slow water movement Slope	1.00 1.00	Very limited Slope Seepage	1.00 0.50
MiE: Mariana-----	95	Very limited Slow water movement Slope	1.00 1.00	Very limited Slope Seepage	1.00 0.50
MkF: Maricao-----	80	Very limited Slow water movement Slope	1.00 1.00	Very limited Slope Seepage	1.00 0.02
MkG: Maricao-----	80	Very limited Slow water movement Slope	1.00 1.00	Very limited Slope Seepage	1.00 0.02
MnA: Melones-----	95	Very limited Slow water movement	1.00	Not limited	
MnC: Melones-----	95	Very limited Slow water movement Slope	1.00 0.04	Very limited Slope	1.00
MoB: Montalva-----	80	Very limited Slow water movement Depth to bedrock	1.00 1.00	Very limited Depth to soft bedrock Slope Seepage	1.00 0.08 0.02

Soil Survey of San Germán Area, Puerto Rico

Table 15a.--Sanitary Facilities (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
MoC: Montalva-----	80	Very limited Slow water movement Depth to bedrock Slope	1.00 1.00 0.04	Very limited Depth to soft bedrock Slope Seepage	1.00 1.00 0.02
MqC: Monte grande-----	90	Very limited Slow water movement Depth to saturated zone	1.00 1.00	Very limited Depth to saturated zone Slope	1.00 1.00
MrD: Morado-----	85	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00
MrE: Morado-----	85	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00
MrF: Morado-----	85	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00
MuC: Múcara-----	80	Very limited Depth to bedrock Slow water movement Slope	1.00 0.50 0.04	Very limited Depth to soft bedrock Slope Seepage	1.00 1.00 0.50
MuD: Múcara-----	80	Very limited Depth to bedrock Slope Slow water movement	1.00 1.00 0.50	Very limited Depth to soft bedrock Slope Seepage	1.00 1.00 0.50
MuE: Múcara-----	80	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 0.50	Very limited Depth to soft bedrock Slope Seepage	1.00 1.00 0.50

Soil Survey of San Germán Area, Puerto Rico

Table 15a.--Sanitary Facilities (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
MuF: Múcara-----	80	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 0.50	Very limited Depth to soft bedrock Slope Seepage	1.00 1.00 0.50
NpD: Niye-----	95	Somewhat limited Slow water movement Slope	0.98 0.84	Very limited Slope Organic matter content Seepage	1.00 1.00 0.02
OrA: Olivares-----	95	Very limited Slow water movement Ponding	1.00 1.00	Very limited Ponding Organic matter content	1.00 1.00
PaA: Palmarejo-----	90	Very limited Slow water movement	1.00	Somewhat limited Seepage	0.50
PaB: Palmarejo-----	90	Very limited Slow water movement	1.00	Somewhat limited Seepage	0.50
PaC: Palmarejo-----	90	Somewhat limited Slow water movement Slope	0.50 0.01	Very limited Slope Seepage	1.00 0.50
PgA: Parguera-----	80	Very limited Slow water movement	1.00	Somewhat limited Seepage	0.02
PgB: Parguera-----	80	Very limited Slow water movement	1.00	Somewhat limited Slope Seepage	0.32 0.02
PsF: Pitahaya-----	60	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00
Limestone outcrop---	20	Not rated		Not rated	
Seboruco-----	15	Very limited Slope Slow water movement	1.00 0.98	Very limited Slope Seepage	1.00 0.02

Soil Survey of San Germán Area, Puerto Rico

Table 15a.--Sanitary Facilities (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
PsG: Pitahaya-----	60	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope	1.00 1.00 1.00
Limestone outcrop---	20	Not rated		Not rated	
Seboruco-----	15	Very limited Slope Slow water movement	1.00 0.98	Very limited Slope Seepage	1.00 0.02
Pt: Pits and quarries---	100	Not rated		Not rated	
PzB: Pozo Blanco-----	95	Very limited Slow water movement Large stones content	1.00 1.00	Very limited Large stones content Seepage Slope	1.00 0.50 0.08
PzC: Pozo Blanco-----	95	Very limited Slow water movement Large stones content Slope	1.00 1.00 0.04	Very limited Large stones content Slope Seepage	1.00 1.00 0.50
PzD: Pozo Blanco-----	95	Very limited Slow water movement Large stones content Slope	1.00 1.00 1.00	Very limited Slope Large stones content Seepage	1.00 1.00 0.50
QbD: Quebrada-----	95	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to soft bedrock Slope Seepage	1.00 1.00 0.50
QbE: Quebrada-----	95	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to soft bedrock Slope Seepage	1.00 1.00 0.50
QbF: Quebrada-----	95	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to soft bedrock Slope Seepage	1.00 1.00 0.50

Soil Survey of San Germán Area, Puerto Rico

Table 15a.--Sanitary Facilities (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
ReA: Reilly-----	95	Very limited Flooding Depth to saturated zone Filtering capacity Seepage, bottom layer	1.00 1.00 1.00 1.00	Very limited Flooding Seepage Depth to saturated zone	1.00 1.00 1.00
RoD: Rosario-----	80	Very limited Depth to bedrock Slope Slow water movement	1.00 1.00 0.50	Very limited Depth to soft bedrock Slope Organic matter content Depth to hard bedrock Seepage	1.00 1.00 1.00 0.88 0.50
RoE: Rosario-----	80	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 0.50	Very limited Depth to soft bedrock Slope Organic matter content Depth to hard bedrock Seepage	1.00 1.00 1.00 0.88 0.50
RoF: Rosario-----	80	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 0.50	Very limited Depth to soft bedrock Slope Organic matter content Depth to hard bedrock Seepage	1.00 1.00 1.00 0.88 0.50
RuF: Rubias-----	60	Very limited Depth to bedrock Slope Slow water movement	1.00 1.00 0.68	Very limited Depth to soft bedrock Slope Depth to hard bedrock Seepage	1.00 1.00 0.42 0.32
Chiquito-----	30	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Slope Seepage	1.00 1.00 0.50

Soil Survey of San Germán Area, Puerto Rico

Table 15a.--Sanitary Facilities (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
RuG: Rubias-----	60	Very limited Depth to bedrock Slope Slow water movement	1.00 1.00 0.68	Very limited Depth to soft bedrock Slope Depth to hard bedrock Seepage	1.00 1.00 0.42 0.32
Chiquito-----	30	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Slope Seepage	1.00 1.00 0.50
Sa: Salt flats, ponded---	100	Not rated		Not rated	
Sb: Salt pits-----	100	Not rated		Not rated	
ScA: San Antón-----	95	Very limited Flooding Seepage, bottom layer Slow water movement	1.00 1.00 0.50	Very limited Flooding Seepage	1.00 1.00
SdD: San Germán-----	95	Very limited Depth to bedrock Slope	1.00 0.84	Very limited Depth to hard bedrock Slope	1.00 1.00
SdF: San Germán-----	95	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to hard bedrock Slope	1.00 1.00
SgD: San Germán-----	60	Very limited Depth to bedrock Slope	1.00 0.84	Very limited Depth to hard bedrock Slope	1.00 1.00
Duey-----	40	Very limited Depth to bedrock Seepage, bottom layer Slope	1.00 1.00 0.84	Very limited Depth to hard bedrock Depth to soft bedrock Seepage Slope	1.00 1.00 1.00 1.00
SgF: San Germán-----	60	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to hard bedrock Slope	1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 15a.--Sanitary Facilities (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
SgF: Duey-----	40	Very limited Depth to bedrock Slope Seepage, bottom layer	1.00 1.00 1.00	Very limited Depth to hard bedrock Depth to soft bedrock Slope Seepage	1.00 1.00 1.00 1.00 1.00
SiA: Santa Isabel-----	95	Very limited Slow water movement Depth to saturated zone	1.00 0.12	Not limited	
SmE: Santa Marta-----	95	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 0.50	Very limited Depth to soft bedrock Slope Seepage Depth to hard bedrock	1.00 1.00 0.50 0.02
SoC: Seboruco-----	90	Somewhat limited Slow water movement	0.98	Very limited Slope Seepage	1.00 0.02
SsB: Sosa-----	90	Very limited Slow water movement	1.00	Somewhat limited Slope Seepage	0.32 0.05
SsC: Sosa-----	90	Very limited Slow water movement Slope	1.00 0.01	Very limited Slope Seepage	1.00 0.05
TeA: Teresa-----	95	Very limited Slow water movement	1.00	Not limited	
TfA: Teresa, ponded-----	95	Very limited Slow water movement Ponding	1.00 1.00	Very limited Ponding	1.00
ToA: Toa-----	90	Very limited Flooding Slow water movement	1.00 0.50	Very limited Flooding Seepage	1.00 0.50
Ua: Urban land-----	100	Not rated		Not rated	

Soil Survey of San Germán Area, Puerto Rico

Table 15a.--Sanitary Facilities (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
UbB:					
Urban land-----	85	Not rated		Not rated	
Bahía-----	10	Not limited		Very limited Seepage Slope	1.00 0.08
UgB:					
Urban land-----	85	Not rated		Not rated	
Guayabo-----	10	Very limited Filtering capacity	1.00	Very limited Seepage Slope	1.00 0.08
UsC:					
Urban land-----	80	Not rated		Not rated	
Sosa-----	15	Very limited Slow water movement Slope	1.00 0.01	Very limited Slope Seepage	1.00 0.05
VaA:					
Vayas-----	90	Very limited Flooding Slow water movement Depth to saturated zone	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00
VoC:					
Voladora-----	90	Very limited Slow water movement Slope	1.00 0.04	Very limited Slope	1.00
VoD:					
Voladora-----	90	Very limited Slow water movement Slope	1.00 1.00	Very limited Slope	1.00
W:					
Water-----	100	Not rated		Not rated	

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Table 15b.--Sanitary Facilities (Part 2)

[The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table]

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AbF: Agüeybaná-----	85	Very limited Slope Too clayey	1.00 1.00	Very limited Slope	1.00	Very limited Slope Too clayey Hard to compact	1.00 1.00 1.00
AgD: Aguilita-----	90	Very limited Depth to bedrock Slope	1.00 0.84	Somewhat limited Slope	0.84	Somewhat limited Slope Depth to bedrock Gravel content	0.84 0.14 0.06
AgF: Aguilita-----	80	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope	1.00	Very limited Slope Depth to bedrock Gravel content	1.00 0.14 0.06
AkA: Aguirre-----	95	Very limited Ponding Too clayey	1.00 1.00	Very limited Ponding	1.00	Very limited Ponding Too clayey Hard to compact	1.00 1.00 1.00
AlF: Aljibe-----	40	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Too clayey Hard to compact Depth to bedrock	1.00 1.00 1.00 1.00
Guamá-----	30	Very limited Slope Too clayey	1.00 1.00	Very limited Slope	1.00	Very limited Slope Too clayey Hard to compact	1.00 1.00 1.00
Indiera-----	25	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00	Very limited Slope Depth to bedrock	1.00 0.71	Very limited Slope Too clayey Hard to compact Depth to bedrock	1.00 1.00 1.00 0.71
AtD: Altamira-----	85	Very limited Depth to bedrock Slope	1.00 0.01	Somewhat limited Slope	0.01	Very limited Carbonate content Depth to bedrock Gravel content Slope	1.00 0.14 0.08 0.01
AtF: Altamira-----	85	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope	1.00	Very limited Slope Carbonate content Depth to bedrock Gravel content	1.00 1.00 0.14 0.08

Soil Survey of San Germán Area, Puerto Rico

Table 15b.--Sanitary Facilities (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BaB: Bahía-----	90	Somewhat limited Too sandy	0.50	Not limited		Somewhat limited Seepage Too sandy	0.50 0.50
BhB: Bahía Salinas-----	90	Very limited Too sandy	1.00	Not limited		Very limited Too sandy Seepage	1.00 1.00
BjA: Bajura-----	90	Very limited Flooding Depth to saturated zone Too clayey	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Depth to saturated zone Too clayey Hard to compact	1.00 1.00 1.00
BkB: Beaches-----	100	Not rated		Not limited		Not rated	
BmC: Bermeja-----	70	Very limited Depth to bedrock Large stones content Slope	1.00 0.74 0.01	Somewhat limited Slope	0.01	Very limited Depth to bedrock Gravel content Large stones content Slope	1.00 0.76 0.74 0.01
Cerro Mariquita-----	20	Very limited Depth to bedrock Large stones content Slope	1.00 0.06 0.01	Somewhat limited Slope	0.01	Very limited Depth to bedrock Gravel content Large stones content Slope	1.00 0.97 0.06 0.01
BmD: Bermeja-----	70	Very limited Depth to bedrock Slope Large stones content	1.00 1.00 0.74	Very limited Slope	1.00	Very limited Depth to bedrock Slope Gravel content Large stones content	1.00 1.00 0.76 0.74
Cerro Mariquita-----	20	Very limited Depth to bedrock Slope Large stones content	1.00 1.00 0.06	Very limited Slope	1.00	Very limited Depth to bedrock Slope Gravel content Large stones content	1.00 1.00 0.97 0.06
BmF: Bermeja-----	75	Very limited Slope Depth to bedrock Large stones content	1.00 1.00 0.74	Very limited Slope	1.00	Very limited Depth to bedrock Slope Gravel content Large stones content	1.00 1.00 0.76 0.74

Soil Survey of San Germán Area, Puerto Rico

Table 15b.--Sanitary Facilities (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BmF: Cerro Mariquita-----	20	Very limited Slope Depth to bedrock Large stones content	1.00 1.00 0.06	Very limited Slope	1.00	Very limited Depth to bedrock Slope Gravel content Large stones content	1.00 1.00 0.97 0.06
BrF: Bermeja-----	75	Very limited Slope Depth to bedrock Large stones content	1.00 1.00 0.74	Very limited Slope	1.00	Very limited Depth to bedrock Slope Gravel content Large stones content	1.00 1.00 0.76 0.74
Rock outcrop-----	15	Not rated		Very limited Slope Depth to bedrock	1.00 1.00	Not rated	
CaC: Cabo Rojo-----	90	Somewhat limited Too clayey	0.50	Not limited		Very limited Hard to compact Too clayey	1.00 0.50
CbD: Caguabo-----	85	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to bedrock Hard to compact Slope Gravel content	1.00 1.00 1.00 0.90
CbF: Caguabo-----	85	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Hard to compact Gravel content	1.00 1.00 1.00 0.90
CeA: Cartagena-----	85	Very limited Too clayey Excess sodium Ponding	1.00 1.00 1.00	Very limited Ponding	1.00	Very limited Too clayey Hard to compact Sodium content Ponding	1.00 1.00 1.00 1.00
CgD: Casabe-----	90	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Slope	1.00	Very limited Depth to bedrock Hard to compact Slope	1.00 1.00 1.00
CgF: Casabe-----	90	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope	1.00	Very limited Depth to bedrock Slope Hard to compact	1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 15b.--Sanitary Facilities (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
ChA: Cataño-----	95	Very limited Too sandy Seepage, bottom layer	1.00 1.00	Very limited Seepage	1.00	Very limited Too sandy Seepage	1.00 1.00
CjD: Cerro Gordo-----	90	Very limited Seepage, bottom layer Slope	1.00 0.63	Very limited Seepage Slope	1.00 0.63	Very limited Hard to compact Seepage Slope Gravel content	1.00 1.00 0.63 0.01
CkD: Cerro Mariquita-----	80	Very limited Depth to bedrock Slope Large stones content	1.00 1.00 0.06	Very limited Slope	1.00	Very limited Depth to bedrock Slope Gravel content Large stones content	1.00 1.00 0.97 0.06
CkF: Cerro Mariquita-----	80	Very limited Slope Depth to bedrock Large stones content	1.00 1.00 0.06	Very limited Slope	1.00	Very limited Depth to bedrock Slope Gravel content Large stones content	1.00 1.00 0.97 0.06
CmB: Coamo-----	90	Very limited Seepage, bottom layer Slope	1.00 0.04	Somewhat limited Slope	0.04	Very limited Seepage Slope Gravel content	1.00 0.04 0.01
CoA: Coloso-----	90	Very limited Flooding Depth to saturated zone Too clayey	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Too clayey Hard to compact Depth to saturated zone	1.00 1.00 0.86
CsE: Consumo-----	80	Very limited Slope Too clayey	1.00 0.50	Very limited Slope	1.00	Very limited Slope Too clayey	1.00 0.50
CsF: Consumo-----	80	Very limited Slope Too clayey	1.00 0.50	Very limited Slope	1.00	Very limited Slope Too clayey	1.00 0.50
CtA: Cortada-----	98	Very limited Flooding Too clayey	1.00 0.50	Very limited Flooding	1.00	Somewhat limited Too clayey	0.50

Soil Survey of San Germán Area, Puerto Rico

Table 15b.--Sanitary Facilities (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CuD:							
Costa-----	67	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Slope	1.00	Very limited Depth to bedrock Carbonate content Slope	1.00 1.00 1.00
Pitahaya-----	25	Very limited Depth to bedrock	1.00	Not limited		Very limited Depth to bedrock Carbonate content Gravel content Hard to compact	1.00 1.00 1.00 1.00
CuF:							
Costa-----	67	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope	1.00	Very limited Depth to bedrock Slope Carbonate content	1.00 1.00 1.00
Pitahaya-----	25	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope	1.00	Very limited Depth to bedrock Slope Carbonate content Gravel content Hard to compact	1.00 1.00 1.00 1.00 1.00
CvF:							
Cuchillas-----	80	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 0.50	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Too clayey	1.00 1.00 0.50
CvG:							
Cuchillas-----	80	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 0.50	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Too clayey	1.00 1.00 0.50
DeD:							
Delicias-----	95	Very limited Too clayey Slope	1.00 0.84	Somewhat limited Slope	0.84	Very limited Too clayey Hard to compact Slope Gravel content	1.00 1.00 0.84 0.01
DqA:							
Dique-----	90	Very limited Flooding	1.00	Very limited Flooding	1.00	Not limited	
DsC:							
Descalabrado-----	90	Very limited Depth to bedrock	1.00	Very limited Depth to bedrock	1.00	Very limited Depth to bedrock Hard to compact	1.00 1.00
DsD:							
Descalabrado-----	90	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to bedrock Hard to compact Slope	1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 15b.--Sanitary Facilities (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
DsF: Descalabrado-----	90	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Hard to compact	1.00 1.00 1.00
EcD: El Cacique-----	60	Very limited Depth to bedrock Too clayey Slope	1.00 1.00 0.84	Very limited Depth to bedrock Slope	1.00 0.84	Very limited Depth to bedrock Too clayey Hard to compact Slope	1.00 1.00 1.00 0.84
La Taína-----	30	Very limited Depth to bedrock Too clayey Slope	1.00 1.00 0.84	Very limited Depth to bedrock Slope	1.00 0.84	Very limited Depth to bedrock Too clayey Gravel content Slope	1.00 1.00 1.00 0.84
EcF: El Cacique-----	60	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Too clayey Hard to compact	1.00 1.00 1.00 1.00
La Taína-----	30	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Too clayey Gravel content	1.00 1.00 1.00 1.00
EcG: El Cacique-----	60	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Too clayey Hard to compact	1.00 1.00 1.00 1.00
La Taína-----	30	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Too clayey Gravel content	1.00 1.00 1.00 1.00
EdD: El Descanso-----	50	Very limited Depth to bedrock Too clayey Organic matter content Slope	1.00 1.00 1.00 0.84	Very limited Depth to bedrock Slope	1.00 0.84	Very limited Depth to bedrock Too clayey Organic matter content Slope	1.00 1.00 1.00 0.84
Hoconuco-----	45	Very limited Depth to bedrock Too clayey Slope	1.00 1.00 0.84	Very limited Depth to bedrock Slope	1.00 0.84	Very limited Depth to bedrock Too clayey Hard to compact Slope	1.00 1.00 1.00 0.84

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Table 15b.--Sanitary Facilities (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
EdF: El Descanso-----	50	Very limited Slope Depth to bedrock Too clayey Organic matter content	1.00 1.00 1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Too clayey Organic matter content	1.00 1.00 1.00 1.00
Hoconuco-----	45	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Too clayey Hard to compact	1.00 1.00 1.00 1.00
EdG: El Descanso-----	50	Very limited Slope Depth to bedrock Too clayey Organic matter content	1.00 1.00 1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Too clayey Organic matter content	1.00 1.00 1.00 1.00
Hoconuco-----	45	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Too clayey Hard to compact	1.00 1.00 1.00 1.00
EpC: El Papayo-----	95	Very limited Depth to bedrock	1.00	Not limited		Very limited Depth to bedrock Hard to compact	1.00 1.00
EpD: El Papayo-----	95	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Slope	1.00	Very limited Depth to bedrock Hard to compact Slope	1.00 1.00 1.00
EpF: El Papayo-----	95	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope	1.00	Very limited Depth to bedrock Slope Hard to compact	1.00 1.00 1.00
FeA: Fé-----	95	Very limited Depth to saturated zone Excess sodium Too clayey	1.00 1.00 1.00	Very limited Depth to saturated zone	1.00	Very limited Sodium content Too clayey Hard to compact	1.00 1.00 1.00
FrA: Fraternidad-----	90	Very limited Too clayey	1.00	Not limited		Very limited Too clayey Hard to compact	1.00 1.00
FrB: Fraternidad-----	90	Very limited Too clayey	1.00	Not limited		Very limited Too clayey Hard to compact	1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 15b.--Sanitary Facilities (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GbF: Guanábano-----	95	Very limited Slope Seepage, bottom layer Too clayey	1.00 1.00 0.50	Very limited Slope Seepage	1.00 1.00	Very limited Slope Seepage Too clayey Gravel content	1.00 0.50 0.50 0.32
GhC: Guanajibo-----	90	Very limited Too clayey	1.00	Not limited		Very limited Too clayey Hard to compact	1.00 1.00
GnA: Guánica-----	80	Very limited Ponding Excess sodium Too clayey	1.00 1.00 1.00	Very limited Ponding	1.00	Very limited Ponding Sodium content Too clayey Hard to compact	1.00 1.00 1.00 1.00
GuB: Guayabo-----	90	Very limited Too sandy	1.00	Not limited		Very limited Too sandy Seepage	1.00 1.00
GyB: Guayacán-----	90	Very limited Excess salt	1.00	Not limited		Not limited	
GyC: Guayacán-----	90	Very limited Excess salt Slope	1.00 0.04	Somewhat limited Slope	0.04	Somewhat limited Slope	0.04
GyD: Guayacán-----	90	Very limited Slope Excess salt	1.00 1.00	Very limited Slope	1.00	Very limited Slope	1.00
HmD: Humatas-----	80	Very limited Too clayey Slope	1.00 1.00	Very limited Slope	1.00	Very limited Too clayey Hard to compact Slope	1.00 1.00 1.00
HmE: Humatas-----	80	Very limited Slope Too clayey	1.00 1.00	Very limited Slope	1.00	Very limited Slope Too clayey Hard to compact	1.00 1.00 1.00
HmF: Humatas-----	80	Very limited Slope Too clayey	1.00 1.00	Very limited Slope	1.00	Very limited Slope Too clayey Hard to compact	1.00 1.00 1.00
JaB: Jácana-----	80	Very limited Depth to bedrock Too clayey	1.00 1.00	Very limited Depth to bedrock	1.00	Very limited Depth to bedrock Too clayey Hard to compact	1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 15b.--Sanitary Facilities (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
JaC: Jácana-----	80	Very limited Depth to bedrock Too clayey Slope	1.00 1.00 0.04	Very limited Depth to bedrock Slope	1.00 0.04	Very limited Depth to bedrock Too clayey Hard to compact Slope	1.00 1.00 1.00 0.04
JBA: Joyuda-----	50	Very limited Flooding Depth to saturated zone Seepage, bottom layer Organic matter content	1.00 1.00 1.00 1.00	Very limited Flooding Depth to saturated zone Seepage	1.00 1.00 1.00	Very limited Depth to saturated zone Seepage Organic matter content	1.00 1.00 1.00
Atolladero-----	30	Very limited Flooding Depth to saturated zone Seepage, bottom layer Excess salt Too sandy	1.00 1.00 1.00 1.00 0.50	Very limited Flooding Depth to saturated zone Seepage	1.00 1.00 1.00	Very limited Seepage Salinity Depth to saturated zone Too sandy	1.00 1.00 0.99 0.50
Bajura-----	20	Very limited Flooding Depth to saturated zone Too clayey	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Depth to saturated zone Too clayey Hard to compact	1.00 1.00 1.00
LcE: La Covana-----	60	Very limited Slope Depth to thin cemented pan	1.00 0.50	Very limited Slope	1.00	Very limited Depth to cemented pan Carbonate content Gravel content Slope	1.00 1.00 1.00 1.00
Limestone outcrop---	20	Not rated		Very limited Slope	1.00	Not rated	
Seboruco-----	15	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Carbonate content Slope	1.00 1.00
LdA: La Luna-----	90	Very limited Flooding	1.00	Very limited Flooding	1.00	Not limited	
LeF: La Tea-----	70	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Too clayey Hard to compact	1.00 1.00 1.00 1.00
LfC: Landfill-----	100	Not rated		Not limited		Not rated	

Soil Survey of San Germán Area, Puerto Rico

Table 15b.--Sanitary Facilities (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LkB: Lares-----	80	Very limited Too clayey	1.00	Not limited		Very limited Too clayey Hard to compact	1.00 1.00
LnA: Llanos Costa-----	75	Not limited		Not limited		Somewhat limited Gravel content	0.13
LnB: Llanos Costa-----	75	Not limited		Not limited		Somewhat limited Gravel content	0.13
LnC: Llanos Costa-----	75	Not limited		Not limited		Somewhat limited Gravel content	0.13
LpG: Los Peñones-----	60	Very limited Slope Depth to bedrock Organic matter content	1.00 1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Seepage Organic matter content	1.00 1.00 1.00 1.00
Limestone outcrop---	40	Not rated		Very limited Slope	1.00	Not rated	
MaB: Mabí-----	70	Very limited Depth to saturated zone Too clayey Flooding	1.00 1.00 0.40	Very limited Depth to saturated zone Flooding	1.00 0.40	Very limited Too clayey Hard to compact Depth to saturated zone	1.00 1.00 0.99
MbA: Maguayo-----	80	Not limited		Not limited		Very limited Hard to compact	1.00
MbC: Maguayo-----	80	Somewhat limited Slope	0.01	Somewhat limited Slope	0.01	Very limited Hard to compact Slope	1.00 0.01
McF: Malaya-----	90	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Hard to compact	1.00 1.00 1.00
MDA: Manglillo-----	50	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Depth to saturated zone Hard to compact	1.00 1.00
Boquerón-----	30	Very limited Flooding Depth to saturated zone Too clayey	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Depth to saturated zone Too clayey Hard to compact	1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 15b.--Sanitary Facilities (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MDA: Serrano-----	20	Very limited Flooding Depth to saturated zone Excess sodium Seepage, bottom layer	1.00 1.00 1.00 1.00	Very limited Flooding Depth to saturated zone Seepage	1.00 1.00 1.00	Very limited Depth to saturated zone Sodium content Seepage	1.00 1.00 1.00
MeA: Maní-----	80	Very limited Flooding Depth to saturated zone Too clayey	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Too clayey Hard to compact Depth to saturated zone	1.00 1.00 0.86
MfF: Maresúa-----	80	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Too clayey Depth to bedrock Gravel content	1.00 1.00 1.00 1.00
MgF: Maresúa-----	40	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Too clayey Depth to bedrock Gravel content	1.00 1.00 1.00 1.00
Serpentine outcrop-----	40	Not rated		Very limited Slope	1.00	Not rated	
MiD: Mariana-----	95	Very limited Too clayey Slope	1.00 1.00	Very limited Slope	1.00	Very limited Too clayey Hard to compact Slope	1.00 1.00 1.00
MiE: Mariana-----	95	Very limited Slope Too clayey	1.00 1.00	Very limited Slope	1.00	Very limited Slope Too clayey Hard to compact	1.00 1.00 1.00
MkF: Maricao-----	80	Very limited Slope Too clayey	1.00 1.00	Very limited Slope	1.00	Very limited Slope Too clayey Hard to compact	1.00 1.00 1.00
MkG: Maricao-----	80	Very limited Slope Too clayey	1.00 1.00	Very limited Slope	1.00	Very limited Slope Too clayey Hard to compact	1.00 1.00 1.00
MnA: Melones-----	95	Not limited		Not limited		Very limited Hard to compact	1.00

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Table 15b.--Sanitary Facilities (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MnC: Melones-----	95	Somewhat limited Slope	0.04	Somewhat limited Slope	0.04	Very limited Hard to compact Slope	1.00 0.04
MoB: Montalva-----	80	Very limited Depth to bedrock	1.00	Not limited		Very limited Hard to compact Depth to bedrock	1.00 1.00
MoC: Montalva-----	80	Very limited Depth to bedrock Slope	1.00 0.04	Somewhat limited Slope	0.04	Very limited Hard to compact Depth to bedrock Slope	1.00 1.00 0.04
MqC: Monte grande-----	90	Very limited Depth to saturated zone Too clayey	1.00 1.00	Very limited Depth to saturated zone	1.00	Very limited Too clayey Gravel content Depth to saturated zone	1.00 0.89 0.47
MrD: Morado-----	85	Very limited Depth to bedrock Too clayey Slope	1.00 1.00 1.00	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Too clayey Depth to bedrock Slope	1.00 1.00 1.00
MrE: Morado-----	85	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Too clayey Depth to bedrock	1.00 1.00 1.00
MrF: Morado-----	85	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Too clayey Depth to bedrock	1.00 1.00 1.00
MuC: Múcara-----	80	Very limited Depth to bedrock Slope	1.00 0.04	Very limited Depth to bedrock Slope	1.00 0.04	Very limited Hard to compact Depth to bedrock Slope	1.00 1.00 0.04
MuD: Múcara-----	80	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Hard to compact Depth to bedrock Slope	1.00 1.00 1.00
MuE: Múcara-----	80	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Hard to compact Depth to bedrock	1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 15b.--Sanitary Facilities (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MuF: Múcara-----	80	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Hard to compact Depth to bedrock	1.00 1.00 1.00
NpD: Nipe-----	95	Very limited Too clayey Slope	1.00 0.84	Somewhat limited Slope	0.84	Very limited Too clayey Hard to compact Slope	1.00 1.00 0.84
OrA: Olivares-----	95	Very limited Ponding Too clayey	1.00 1.00	Very limited Ponding	1.00	Very limited Ponding Too clayey Hard to compact	1.00 1.00 1.00
PaA: Palmarejo-----	90	Very limited Too clayey	1.00	Not limited		Very limited Too clayey	1.00
PaB: Palmarejo-----	90	Very limited Too clayey	1.00	Not limited		Very limited Too clayey	1.00
PaC: Palmarejo-----	90	Very limited Too clayey Slope	1.00 0.01	Somewhat limited Slope	0.01	Very limited Too clayey Slope	1.00 0.01
PgA: Parguera-----	80	Not limited		Not limited		Somewhat limited Gravel content	0.73
PgB: Parguera-----	80	Not limited		Not limited		Somewhat limited Gravel content	0.73
PsF: Pitahaya-----	60	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope	1.00	Very limited Depth to bedrock Slope Carbonate content Gravel content Hard to compact	1.00 1.00 1.00 1.00 1.00
Limestone outcrop---	20	Not rated		Very limited Slope	1.00	Not rated	
Seboruco-----	15	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Carbonate content	1.00 1.00
PsG: Pitahaya-----	60	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope	1.00	Very limited Depth to bedrock Slope Carbonate content Gravel content Hard to compact	1.00 1.00 1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 15b.--Sanitary Facilities (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
PsG: Limestone outcrop---	20	Not rated		Very limited Slope	1.00	Not rated	
Seboruco-----	15	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope Carbonate content	1.00 1.00
Pt: Pits and quarries---	100	Not rated		Not rated		Not rated	
PzB: Pozo Blanco-----	95	Somewhat limited Large stones content	0.30	Not limited		Very limited Carbonate content Large stones content	1.00 0.30
PzC: Pozo Blanco-----	95	Somewhat limited Large stones content Slope	0.30 0.04	Somewhat limited Slope	0.04	Very limited Carbonate content Large stones content Slope	1.00 0.30 0.04
PzD: Pozo Blanco-----	95	Very limited Slope Large stones content	1.00 0.30	Very limited Slope	1.00	Very limited Slope Carbonate content Large stones content	1.00 1.00 0.30
QbD: Quebrada-----	95	Very limited Depth to bedrock Too clayey Slope	1.00 1.00 1.00	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to bedrock Too clayey Slope	1.00 1.00 1.00
QbE: Quebrada-----	95	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Too clayey	1.00 1.00 1.00
QbF: Quebrada-----	95	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Too clayey	1.00 1.00 1.00
ReA: Reilly-----	95	Very limited Flooding Depth to saturated zone Seepage, bottom layer Too sandy	1.00 1.00 1.00 1.00	Very limited Flooding Depth to saturated zone Seepage	1.00 1.00 1.00	Very limited Too sandy Seepage Gravel content Depth to saturated zone	1.00 1.00 1.00 0.47

Soil Survey of San Germán Area, Puerto Rico

Table 15b.--Sanitary Facilities (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
RoD: Rosario-----	80	Very limited Depth to bedrock Too clayey Slope	1.00 1.00 1.00	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Too clayey Depth to bedrock Slope	1.00 1.00 1.00
RoE: Rosario-----	80	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Too clayey Depth to bedrock	1.00 1.00 1.00
RoF: Rosario-----	80	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Too clayey Depth to bedrock	1.00 1.00 1.00
RuF: Rubias-----	60	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 0.50	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Too clayey	1.00 1.00 0.50
Chiquito-----	30	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 0.50	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Hard to compact Gravel content Too clayey	1.00 1.00 1.00 0.91 0.50
RuG: Rubias-----	60	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 0.50	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Too clayey	1.00 1.00 0.50
Chiquito-----	30	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 0.50	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Hard to compact Gravel content Too clayey	1.00 1.00 1.00 0.91 0.50
Sa: Salt flats, ponded---	100	Not rated		Very limited Flooding Ponding	1.00 1.00	Not rated	
Sb: Salt pits-----	100	Not rated		Very limited Flooding Ponding	1.00 1.00	Not rated	
SCA: San Antón-----	95	Very limited Flooding Seepage, bottom layer	1.00 1.00	Very limited Flooding Seepage	1.00 1.00	Somewhat limited Seepage	0.21

Soil Survey of San Germán Area, Puerto Rico

Table 15b.--Sanitary Facilities (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
SdD: San Germán-----	95	Very limited Depth to bedrock Slope	1.00 0.84	Very limited Depth to bedrock Slope	1.00 0.84	Very limited Gravel content Depth to bedrock Slope	1.00 1.00 0.84
SdF: San Germán-----	95	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Gravel content Depth to bedrock	1.00 1.00 1.00
SgD: San Germán-----	60	Very limited Depth to bedrock Slope	1.00 0.84	Very limited Depth to bedrock Slope	1.00 0.84	Very limited Gravel content Depth to bedrock Slope	1.00 1.00 0.84
Duey-----	40	Very limited Depth to bedrock Seepage, bottom layer Slope Too clayey	1.00 1.00 0.84 0.50	Very limited Depth to bedrock Slope	1.00 0.84	Very limited Depth to bedrock Carbonate content Slope Gravel content Seepage	1.00 1.00 0.84 0.60 0.50
SgF: San Germán-----	60	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Gravel content Depth to bedrock	1.00 1.00 1.00
Duey-----	40	Very limited Slope Depth to bedrock Seepage, bottom layer Too clayey	1.00 1.00 1.00 0.50	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slope Carbonate content Gravel content Seepage	1.00 1.00 1.00 0.60 0.50
SiA: Santa Isabel-----	95	Very limited Depth to saturated zone Too clayey	1.00 1.00	Very limited Depth to saturated zone	1.00	Very limited Too clayey Hard to compact	1.00 1.00
SmE: Santa Marta-----	95	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Slope Too clayey Depth to bedrock Gravel content	1.00 1.00 1.00 0.66
SoC: Seboruco-----	90	Not limited		Not limited		Very limited Carbonate content	1.00
SsB: Sosa-----	90	Not limited		Not limited		Not limited	
SsC: Sosa-----	90	Somewhat limited Slope	0.01	Somewhat limited Slope	0.01	Somewhat limited Slope	0.01

Soil Survey of San Germán Area, Puerto Rico

Table 15b.--Sanitary Facilities (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
TeA: Teresa-----	95	Very limited Too clayey	1.00	Not limited		Very limited Too clayey Hard to compact	1.00 1.00
TfA: Teresa, ponded-----	95	Very limited Too clayey Ponding	1.00 1.00	Very limited Ponding	1.00	Very limited Too clayey Hard to compact Ponding	1.00 1.00 1.00
ToA: Toa-----	90	Very limited Flooding Too clayey	1.00 1.00	Very limited Flooding	1.00	Very limited Too clayey Hard to compact	1.00 1.00
Ua: Urban land-----	100	Not rated		Not rated		Not rated	
UbB: Urban land-----	85	Not rated		Not limited		Not rated	
Bahía-----	10	Somewhat limited Too sandy	0.50	Not limited		Somewhat limited Seepage Too sandy	0.50 0.50
UgB: Urban land-----	85	Not rated		Not limited		Not rated	
Guayabo-----	10	Very limited Too sandy	1.00	Not limited		Very limited Too sandy Seepage	1.00 1.00
UsC: Urban land-----	80	Not rated		Not limited		Not rated	
Sosa-----	15	Somewhat limited Slope	0.01	Somewhat limited Slope	0.01	Somewhat limited Slope	0.01
VaA: Vayas-----	90	Very limited Flooding Depth to saturated zone Too clayey	1.00 1.00 0.50	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Depth to saturated zone Hard to compact Too clayey	1.00 1.00 0.50
VoC: Voladora-----	90	Very limited Too clayey Slope	1.00 0.04	Somewhat limited Slope	0.04	Very limited Too clayey Slope	1.00 0.04
VoD: Voladora-----	90	Very limited Too clayey Slope	1.00 1.00	Very limited Slope	1.00	Very limited Too clayey Slope	1.00 1.00
W: Water-----	100	Not rated		Not rated		Not rated	

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Table 16a.--Construction Materials (Part 1)

[The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The ratings given for the thickest layer are for the thickest layer above and excluding the bottom layer. The numbers in the value columns range from 0.00 to 0.99. The greater the value, the greater the likelihood that the bottom layer or thickest layer of the soil is a source of sand or gravel. See text for further explanation of ratings in this table]

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
AbF: Agüeybaná-----	85	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
AgD: Aguilita-----	90	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
AgF: Aguilita-----	80	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
AkA: Aguirre-----	95	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
AlF: Aljibe-----	40	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Guamá-----	30	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Indiera-----	25	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
AtD: Altamira-----	85	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
AtF: Altamira-----	85	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
BaB: Bahía-----	90	Poor Bottom layer Thickest layer	0.00 0.00	Fair Bottom layer Thickest layer	0.11 0.23
BhB: Bahía Salinas-----	90	Poor Thickest layer Bottom layer	0.00 0.00	Fair Thickest layer Bottom layer	0.39 0.68

Soil Survey of San Germán Area, Puerto Rico

Table 16a.--Construction Materials (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
BjA: Bajura-----	90	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
BkB: Beaches-----	100	Not rated		Not rated	
BmC: Bermeja-----	70	Fair Thickest layer Bottom layer	0.00 0.03	Fair Thickest layer Bottom layer	0.00 0.03
Cerro Mariquita-----	20	Fair Thickest layer Bottom layer	0.00 0.03	Poor Bottom layer Thickest layer	0.00 0.00
BmD: Bermeja-----	70	Fair Thickest layer Bottom layer	0.00 0.03	Fair Thickest layer Bottom layer	0.00 0.03
Cerro Mariquita-----	20	Fair Thickest layer Bottom layer	0.00 0.03	Poor Bottom layer Thickest layer	0.00 0.00
BmF: Bermeja-----	70	Fair Thickest layer Bottom layer	0.00 0.03	Fair Thickest layer Bottom layer	0.00 0.03
Cerro Mariquita-----	20	Fair Thickest layer Bottom layer	0.00 0.03	Poor Bottom layer Thickest layer	0.00 0.00
BrF: Bermeja-----	75	Fair Thickest layer Bottom layer	0.00 0.03	Fair Thickest layer Bottom layer	0.00 0.03
Rock outcrop-----	15	Not rated		Not rated	
CaC: Cabo Rojo-----	90	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
CbD: Caguabo-----	85	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
CbF: Caguabo-----	85	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
CeA: Cartagena-----	85	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00

Soil Survey of San Germán Area, Puerto Rico

Table 16a.--Construction Materials (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
CgD: Casabe-----	90	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
CgF: Casabe-----	90	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
ChA: Cataño-----	95	Poor Bottom layer Thickest layer	0.00 0.00	Fair Thickest layer Bottom layer	0.86 0.89
CjD: Cerro Gordo-----	90	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
CkD: Cerro Mariquita-----	80	Fair Thickest layer Bottom layer	0.00 0.03	Poor Bottom layer Thickest layer	0.00 0.00
CkF: Cerro Mariquita-----	80	Fair Thickest layer Bottom layer	0.00 0.03	Poor Bottom layer Thickest layer	0.00 0.00
CmB: Coamo-----	90	Poor Thickest layer Bottom layer	0.00 0.00	Fair Thickest layer Bottom layer	0.00 0.03
CoA: Coloso-----	90	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
CsE: Consumo-----	80	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
CsF: Consumo-----	80	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
CtA: Cortada-----	98	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
CuD: Costa-----	67	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00

Soil Survey of San Germán Area, Puerto Rico

Table 16a.--Construction Materials (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
CuD: Pitahaya-----	25	Fair Thickest layer Bottom layer	 0.00 0.53	Poor Bottom layer Thickest layer	 0.00 0.00
CuF: Costa-----	67	Poor Bottom layer Thickest layer	 0.00 0.00	Poor Bottom layer Thickest layer	 0.00 0.00
Pitahaya-----	25	Fair Thickest layer Bottom layer	 0.00 0.53	Poor Bottom layer Thickest layer	 0.00 0.00
CvF: Cuchillas-----	80	Poor Thickest layer Bottom layer	 0.00 0.00	Poor Bottom layer Thickest layer	 0.00 0.00
CvG: Cuchillas-----	80	Poor Thickest layer Bottom layer	 0.00 0.00	Poor Bottom layer Thickest layer	 0.00 0.00
DeD: Delicias-----	95	Poor Bottom layer Thickest layer	 0.00 0.00	Poor Bottom layer Thickest layer	 0.00 0.00
DqA: Dique-----	90	Poor Thickest layer Bottom layer	 0.00 0.00	Poor Bottom layer Thickest layer	 0.00 0.00
DsC: Descalabrado-----	90	Poor Bottom layer Thickest layer	 0.00 0.00	Poor Bottom layer Thickest layer	 0.00 0.00
DsD: Descalabrado-----	90	Poor Bottom layer Thickest layer	 0.00 0.00	Poor Bottom layer Thickest layer	 0.00 0.00
DsF: Descalabrado-----	90	Poor Thickest layer Bottom layer	 0.00 0.00	Poor Bottom layer Thickest layer	 0.00 0.00
EcD: El Cacique-----	60	Poor Bottom layer Thickest layer	 0.00 0.00	Poor Bottom layer Thickest layer	 0.00 0.00
La Taína-----	30	Fair Thickest layer Bottom layer	 0.00 0.62	Poor Bottom layer Thickest layer	 0.00 0.00

Soil Survey of San Germán Area, Puerto Rico

Table 16a.--Construction Materials (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
EcF: El Cacique-----	60	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
La Taína-----	30	Fair Thickest layer Bottom layer	0.00 0.62	Poor Bottom layer Thickest layer	0.00 0.00
EcG: El Cacique-----	60	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
La Taína-----	30	Fair Thickest layer Bottom layer	0.00 0.62	Poor Bottom layer Thickest layer	0.00 0.00
EdD: El Descanso-----	50	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Hoconuco-----	45	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
EdF: El Descanso-----	50	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Hoconuco-----	45	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
EdG: El Descanso-----	50	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Hoconuco-----	45	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
EpC: El Papayo-----	95	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
EpD: El Papayo-----	95	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
EpF: El Papayo-----	95	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00

Soil Survey of San Germán Area, Puerto Rico

Table 16a.--Construction Materials (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
FeA: Fé-----	95	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
FrA: Fraternidad-----	90	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
FrB: Fraternidad-----	90	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
GbF: Guanábano-----	95	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
GhC: Guanajibo-----	90	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
GnA: Guánica-----	80	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
GuB: Guayabo-----	90	Poor Thickest layer Bottom layer	0.00 0.00	Fair Bottom layer Thickest layer	0.11 0.92
GyB: Guayacán-----	90	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
GyC: Guayacán-----	90	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
GyD: Guayacán-----	90	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
HmD: Humatas-----	80	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
HmE: Humatas-----	80	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00

Soil Survey of San Germán Area, Puerto Rico

Table 16a.--Construction Materials (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
HmF: Humatas-----	80	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
JaB: Jácana-----	80	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
JaC: Jácana-----	80	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
JBA: Joyuda-----	50	Poor Organic matter content Thickest layer Bottom layer	0.00 0.00 0.00	Poor Bottom layer Thickest layer Organic matter content	0.00 0.00 0.00
Atolladero-----	30	Poor Thickest layer Bottom layer	0.00 0.00	Fair Bottom layer Thickest layer	0.10 0.11
Bajura-----	20	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
LcE: La Covana-----	60	Fair Thickest layer Bottom layer	0.07 0.57	Poor Bottom layer Thickest layer	0.00 0.00
Limestone outcrop---	20	Not rated		Not rated	
Seboruco-----	15	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
LdA: La Luna-----	90	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
LeF: La Tea-----	70	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
LfC: Landfill-----	100	Not rated		Not rated	
LkB: Lares-----	80	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00

Soil Survey of San Germán Area, Puerto Rico

Table 16a.--Construction Materials (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
LnA: Llanos Costa-----	75	Poor Bottom layer Thickest layer	0.00 0.00	Fair Thickest layer Bottom layer	0.00 0.01
LnB: Llanos Costa-----	75	Poor Bottom layer Thickest layer	0.00 0.00	Fair Thickest layer Bottom layer	0.00 0.01
LnC: Llanos Costa-----	75	Poor Thickest layer Bottom layer	0.00 0.00	Fair Thickest layer Bottom layer	0.00 0.01
LpG: Los Penones-----	60	Poor Organic matter content Thickest layer Bottom layer	0.00 0.00 0.00	Poor Bottom layer Thickest layer Organic matter content	0.00 0.00 0.00
Limestone outcrop---	40	Not rated		Not rated	
MaB: Mabí-----	70	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
MbA: Maguayo-----	80	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
MbC: Maguayo-----	80	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
McF: Malaya-----	90	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
MDA: Manglillo-----	50	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Boquerón-----	30	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Serrano-----	20	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
MeA: Maní-----	80	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00

Soil Survey of San Germán Area, Puerto Rico

Table 16a.--Construction Materials (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
MfF: Maresúa-----	80	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
MgF: Maresúa-----	40	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Serpentinite outcrop-----	40	Not rated		Not rated	
MiD: Mariana-----	95	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
MiE: Mariana-----	95	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
MkF: Maricao-----	80	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
MkG: Maricao-----	80	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
MnA: Melones-----	95	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
MnC: Melones-----	95	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
MoB: Montalva-----	80	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
MoC: Montalva-----	80	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
MqC: Monte grande-----	90	Fair Thickest layer Bottom layer	0.00 0.12	Poor Bottom layer Thickest layer	0.00 0.00
MrD: Morado-----	85	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00

Soil Survey of San Germán Area, Puerto Rico

Table 16a.--Construction Materials (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
MrE: Morado-----	85	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
MrF: Morado-----	85	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
MuC: Múcara-----	80	Poor Thickest layer Bottom layer	0.00 0.00	Poor Thickest layer Bottom layer	0.00 0.00
MuD: Múcara-----	80	Poor Thickest layer Bottom layer	0.00 0.00	Poor Thickest layer Bottom layer	0.00 0.00
MuE: Múcara-----	80	Poor Bottom layer Thickest layer	0.00 0.00	Poor Thickest layer Bottom layer	0.00 0.00
MuF: Múcara-----	80	Poor Bottom layer Thickest layer	0.00 0.00	Poor Thickest layer Bottom layer	0.00 0.00
NpD: Nipe-----	95	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
OrA: Olivares-----	95	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
PaA: Palmarejo-----	90	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
PaB: Palmarejo-----	90	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
PaC: Palmarejo-----	90	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
PgA: Parguera-----	80	Fair Bottom layer Thickest layer	0.00 0.34	Fair Bottom layer Thickest layer	0.00 0.03

Soil Survey of San Germán Area, Puerto Rico

Table 16a.--Construction Materials (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
PgB: Parguera-----	80	Fair Bottom layer Thickest layer	0.00 0.34	Fair Bottom layer Thickest layer	0.00 0.03
PsF: Pitahaya-----	60	Fair Thickest layer Bottom layer	0.00 0.53	Poor Bottom layer Thickest layer	0.00 0.00
Limestone outcrop---	20	Not rated		Not rated	
Seboruco-----	15	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
PsG: Pitahaya-----	60	Fair Thickest layer Bottom layer	0.00 0.53	Poor Bottom layer Thickest layer	0.00 0.00
Limestone outcrop---	20	Not rated		Not rated	
Seboruco-----	15	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Pt: Pits and quarries---	100	Not rated		Not rated	
PzB: Pozo Blanco-----	95	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
PzC: Pozo Blanco-----	95	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
PzD: Pozo Blanco-----	95	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
QbD: Quebrada-----	95	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
QbE: Quebrada-----	95	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
QbF: Quebrada-----	95	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00

Soil Survey of San Germán Area, Puerto Rico

Table 16a.--Construction Materials (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
ReA: Reilly-----	95	Fair		Fair	
		Thickest layer	0.00	Thickest layer	0.11
		Bottom layer	0.31	Bottom layer	0.19
RoD: Rosario-----	80	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
RoE: Rosario-----	80	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
RoF: Rosario-----	80	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
RuF: Rubias-----	60	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Chiquito-----	30	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
RuG: Rubias-----	60	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Chiquito-----	30	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
Sa: Salt flats, ponded---	100	Not rated		Not rated	
Sb: Salt pits-----	100	Not rated		Not rated	
ScA: San Anton-----	95	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
SdD: San Germán-----	95	Fair		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.60	Thickest layer	0.00
SdF: San Germán-----	95	Fair		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.60	Thickest layer	0.00

Soil Survey of San Germán Area, Puerto Rico

Table 16a.--Construction Materials (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
SgD: San Germán-----	60	Fair Thickest layer Bottom layer	0.00 0.60	Poor Bottom layer Thickest layer	0.00 0.00
Duey-----	40	Fair Thickest layer Bottom layer	0.00 0.85	Poor Bottom layer Thickest layer	0.00 0.00
SgF: San Germán-----	60	Fair Thickest layer Bottom layer	0.00 0.60	Poor Bottom layer Thickest layer	0.00 0.00
Duey-----	40	Fair Thickest layer Bottom layer	0.00 0.85	Poor Bottom layer Thickest layer	0.00 0.00
SiA: Santa Isabel-----	95	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
SmE: Santa Marta-----	95	Fair Bottom layer Thickest layer	0.12 0.12	Poor Bottom layer Thickest layer	0.00 0.00
SoC: Seboruco-----	90	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
SsB: Sosa-----	90	Poor Thickest layer Bottom layer	0.00 0.00	Fair Thickest layer Bottom layer	0.00 0.06
SsC: Sosa-----	90	Poor Bottom layer Thickest layer	0.00 0.00	Fair Thickest layer Bottom layer	0.00 0.06
TeA: Teresa-----	95	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
TfA: Teresa, ponded-----	95	Poor Thickest layer Bottom layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
ToA: Toa-----	90	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Ua: Urban land-----	100	Not rated		Not rated	

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Table 16a.--Construction Materials (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
UbB: Urban land-----	85	Not rated		Not rated	
Bahía-----	10	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.11
		Thickest layer	0.00	Thickest layer	0.23
UgB: Urban land-----	85	Not rated		Not rated	
Guayabo-----	10	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.11
		Thickest layer	0.00	Thickest layer	0.92
UsC: Urban land-----	80	Not rated		Not rated	
Sosa-----	15	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.06
VaA: Vayas-----	90	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
VoC: Voladora-----	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
VoD: Voladora-----	90	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
W: Water-----	100	Not rated		Not rated	

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Table 16b.--Construction Materials (Part 2)

[The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 0.99. The smaller the value, the greater the limitation. See text for further explanation of ratings in this table]

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AbF: Agüeybaná-----	85	Poor Too clayey Too acid	0.00 0.05	Poor Low strength Slope Shrink-swell	0.00 0.00 0.93	Poor Slope Too clayey Too acid	0.00 0.00 0.41
AgD: Aguilita-----	90	Poor Carbonate content	0.00	Fair Depth to bedrock Shrink-swell	0.87 0.91	Poor Carbonate content Rock fragments Slope	0.00 0.00 0.16
AgF: Aguilita-----	80	Poor Carbonate content	0.00	Poor Slope Depth to bedrock Shrink-swell	0.00 0.87 0.91	Poor Slope Carbonate content Rock fragments	0.00 0.00 0.00
AkA: Aguirre-----	95	Poor Too clayey	0.00	Poor Shrink-swell Low strength	0.00 0.00	Poor Too clayey	0.00
AlF: Aljibe-----	40	Poor Too clayey Droughty Too acid Depth to bedrock	0.00 0.64 0.68 0.90	Poor Low strength Depth to bedrock Slope	0.00 0.00 0.00	Poor Slope Too clayey Depth to bedrock	0.00 0.00 0.90
Guamá-----	30	Poor Too clayey Too acid	0.00 0.32	Poor Low strength Slope Shrink-swell	0.00 0.00 0.91	Poor Slope Too clayey	0.00 0.00
Indiera-----	25	Poor Too clayey Too acid	0.00 0.50	Poor Low strength Slope Depth to bedrock	0.00 0.00 0.29	Poor Slope Too clayey	0.00 0.00
AtD: Altamira-----	85	Poor Carbonate content Too alkaline Organic matter content low Too clayey	0.00 0.00 0.50 0.88	Poor Shrink-swell Depth to bedrock	0.00 0.87	Poor Carbonate content Rock fragments Too clayey	0.00 0.00 0.57
AtF: Altamira-----	85	Poor Carbonate content Too alkaline Organic matter content low Too clayey	0.00 0.00 0.50 0.88	Poor Slope Shrink-swell Depth to bedrock	0.00 0.00 0.87	Poor Slope Carbonate content Rock fragments Too clayey	0.00 0.00 0.00 0.57

Soil Survey of San Germán Area, Puerto Rico

Table 16b.--Construction Materials (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BaB: Bahía-----	90	Poor Wind erosion Too sandy Organic matter content low Too acid	0.00 0.02 0.19 0.46	Good		Fair Too sandy	0.02
BhB: Bahía Salinas-----	90	Poor Too sandy Wind erosion Droughty Organic matter content low Carbonate content Salinity Sodium content	0.00 0.00 0.00 0.12 0.32 0.50 0.97	Good		Poor Too sandy Salinity Carbonate content Rock fragments Sodium content	0.00 0.00 0.32 0.82 0.98
BjA: Bajura-----	90	Poor Too clayey Organic matter content low	0.00 0.15	Poor Wetness depth Shrink-swell Low strength	0.00 0.00 0.00	Poor Too clayey Wetness depth	0.00 0.00
BkB: Beaches-----	100	Not rated		Not rated		Not rated	
BmC: Bermeja-----	70	Poor Droughty Depth to bedrock Cobble content Organic matter content low Too acid	0.00 0.00 0.26 0.50 0.54	Poor Depth to bedrock	0.00	Poor Rock fragments Depth to bedrock Too acid	0.00 0.00 0.98
Cerro Mariquita----	20	Poor Too clayey Droughty Depth to bedrock Organic matter content low Cobble content	0.00 0.00 0.00 0.88 0.94	Poor Depth to bedrock Shrink-swell	0.00 0.87	Poor Too clayey Rock fragments Depth to bedrock	0.00 0.00 0.00
BmD: Bermeja-----	70	Poor Droughty Depth to bedrock Cobble content Organic matter content low Too acid	0.00 0.00 0.26 0.50 0.54	Poor Depth to bedrock Slope	0.00 0.98	Poor Rock fragments Depth to bedrock Slope Too acid	0.00 0.00 0.00 0.98

Soil Survey of San Germán Area, Puerto Rico

Table 16b.--Construction Materials (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BmD: Cerro Mariquita----	20	Poor Too clayey Droughty Depth to bedrock Organic matter content low Cobble content	0.00 0.00 0.00 0.88 0.94	Poor Depth to bedrock Shrink-swell Slope	0.00 0.87 0.98	Poor Too clayey Rock fragments Depth to bedrock Slope	0.00 0.00 0.00 0.00
BmF: Bermeja-----	70	Poor Droughty Depth to bedrock Cobble content Organic matter content low Too acid	0.00 0.00 0.26 0.50 0.54	Poor Depth to bedrock Slope	0.00 0.00	Poor Slope Rock fragments Depth to bedrock Too acid	0.00 0.00 0.00 0.98
Cerro Mariquita----	20	Poor Too clayey Droughty Depth to bedrock Organic matter content low Cobble content	0.00 0.00 0.00 0.88 0.94	Poor Depth to bedrock Slope Shrink-swell	0.00 0.00 0.87	Poor Slope Too clayey Rock fragments Depth to bedrock	0.00 0.00 0.00 0.00
BrF: Bermeja-----	75	Poor Droughty Depth to bedrock Cobble content Organic matter content low Too acid	0.00 0.00 0.26 0.50 0.54	Poor Depth to bedrock Slope	0.00 0.00	Poor Slope Rock fragments Depth to bedrock Too acid	0.00 0.00 0.00 0.98
Rock outcrop-----	15	Not rated		Not rated		Not rated	
CaC: Cabo Rojo-----	90	Poor Too clayey Organic matter content low Too acid	0.00 0.01 0.68	Poor Low strength Shrink-swell	0.00 0.87	Poor Too clayey	0.00
CbD: Caguabo-----	85	Poor Droughty Depth to bedrock Too clayey	0.00 0.00 0.99	Poor Depth to bedrock	0.00	Poor Depth to bedrock Slope Rock fragments Too clayey	0.00 0.00 0.00 0.99
CbF: Caguabo-----	85	Poor Droughty Depth to bedrock Too clayey	0.00 0.00 0.99	Poor Depth to bedrock Slope	0.00 0.00	Poor Slope Depth to bedrock Rock fragments Too clayey	0.00 0.00 0.00 0.99

Soil Survey of San Germán Area, Puerto Rico

Table 16b.--Construction Materials (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CeA: Cartagena-----	85	Poor Too clayey Sodium content Salinity	0.00 0.00 0.50	Poor Shrink-swell Low strength	0.00 0.00	Poor Too clayey Salinity Sodium content	0.00 0.00 0.00
CgD: Casabe-----	90	Poor Droughty Depth to bedrock Too clayey	0.00 0.00 0.00	Poor Depth to bedrock Low strength Slope Shrink-swell	0.00 0.00 0.68 0.87	Poor Depth to bedrock Too clayey Slope	0.00 0.00 0.00
CgF: Casabe-----	90	Poor Droughty Depth to bedrock Too clayey	0.00 0.00 0.00	Poor Depth to bedrock Low strength Slope Shrink-swell	0.00 0.00 0.00 0.87	Poor Slope Depth to bedrock Too clayey	0.00 0.00 0.00
ChA: Cataño-----	95	Poor Too sandy Wind erosion Carbonate content Droughty Organic matter content low	0.00 0.00 0.32 0.86 0.88	Good		Poor Too sandy Carbonate content	0.00 0.32
CjD: Cerro Gordo-----	90	Fair Too acid Too clayey	0.50 0.80	Fair Shrink-swell	0.87	Fair Rock fragments Slope Too clayey Hard to reclaim (rock fragments)	0.02 0.37 0.79 0.97
CkD: Cerro Mariquita----	80	Poor Too clayey Droughty Depth to bedrock Organic matter content low Cobble content	0.00 0.00 0.00 0.88 0.94	Poor Depth to bedrock Shrink-swell Slope	0.00 0.87 0.92	Poor Too clayey Rock fragments Depth to bedrock Slope	0.00 0.00 0.00 0.00
CkF: Cerro Mariquita----	80	Poor Too clayey Droughty Depth to bedrock Organic matter content low Cobble content	0.00 0.00 0.00 0.88 0.94	Poor Depth to bedrock Slope Shrink-swell	0.00 0.00 0.87	Poor Slope Too clayey Rock fragments Depth to bedrock	0.00 0.00 0.00 0.00

Soil Survey of San Germán Area, Puerto Rico

Table 16b.--Construction Materials (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CmB: Coamo-----	90	Fair Carbonate content	0.08	Fair Shrink-swell	0.78	Poor Hard to reclaim (rock fragments) Rock fragments Carbonate content Slope	0.00 0.12 0.91 0.96
CoA: Coloso-----	90	Poor Too clayey	0.00	Poor Shrink-swell Low strength Wetness depth	0.00 0.00 0.53	Poor Too clayey Wetness depth	0.00 0.53
CsE: Consumo-----	80	Fair Too clayey Organic matter content low Too acid	0.12 0.30 0.50	Poor Low strength Slope Shrink-swell	0.00 0.00 0.96	Poor Slope Too clayey Too acid	0.00 0.08 0.76
CsF: Consumo-----	80	Fair Too clayey Organic matter content low Too acid	0.12 0.30 0.50	Poor Slope Low strength Shrink-swell	0.00 0.00 0.96	Poor Slope Too clayey Too acid	0.00 0.08 0.76
CtA: Cortada-----	98	Fair Too clayey Sodium content	0.32 0.97	Fair Low strength	0.78	Fair Too clayey Rock fragments Sodium content	0.32 0.82 0.98
CuD: Costa-----	67	Poor Droughty Carbonate content Depth to bedrock Too clayey Organic matter content low	0.00 0.00 0.00 0.00 0.08	Poor Depth to bedrock Low strength	0.00 0.00	Poor Depth to bedrock Carbonate content Slope Too clayey Rock fragments	0.00 0.00 0.00 0.00 0.99
Pitahaya-----	25	Poor Droughty Carbonate content Depth to bedrock Too clayey	0.00 0.00 0.00 0.00	Poor Depth to bedrock	0.00	Poor Carbonate content Rock fragments Depth to bedrock Too clayey	0.00 0.00 0.00 0.00
CuF: Costa-----	67	Poor Droughty Carbonate content Depth to bedrock Too clayey Organic matter content low	0.00 0.00 0.00 0.00 0.08	Poor Depth to bedrock Low strength Slope	0.00 0.00 0.00	Poor Slope Depth to bedrock Carbonate content Too clayey Rock fragments	0.00 0.00 0.00 0.00 0.00 0.99

Soil Survey of San Germán Area, Puerto Rico

Table 16b.--Construction Materials (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CuF: Pitahaya-----	25	Poor Droughty Carbonate content Depth to bedrock Too clayey	0.00 0.00 0.00 0.00	Poor Depth to bedrock Slope	0.00 0.00	Poor Slope Carbonate content Rock fragments Depth to bedrock Too clayey	0.00 0.00 0.00 0.00 0.00
CvF: Cuchillas-----	80	Poor Droughty Depth to bedrock	0.00 0.00	Poor Depth to bedrock Low strength Slope Shrink-swell	0.00 0.00 0.00 0.87	Poor Slope Depth to bedrock Rock fragments Hard to reclaim (dense layer)	0.00 0.00 0.32 0.94
CvG: Cuchillas-----	80	Poor Droughty Depth to bedrock	0.00 0.00	Poor Depth to bedrock Slope Low strength Shrink-swell	0.00 0.00 0.00 0.87	Poor Slope Depth to bedrock Rock fragments Hard to reclaim (dense layer)	0.00 0.00 0.32 0.94
DeD: Delicias-----	95	Poor Too clayey Too acid	0.00 0.50	Poor Low strength Shrink-swell	0.00 0.87	Poor Too clayey Rock fragments Slope Too acid Hard to reclaim (rock fragments)	0.00 0.04 0.16 0.98 0.99
DqA: Dique-----	90	Fair Organic matter content low	0.88	Poor Low strength	0.00	Good	
DsC: Descalabrado-----	90	Poor Droughty Depth to bedrock Too clayey	0.00 0.00 0.00	Poor Depth to bedrock	0.00	Poor Depth to bedrock Too clayey Rock fragments	0.00 0.00 0.04
DsD: Descalabrado-----	90	Poor Droughty Depth to bedrock Too clayey	0.00 0.00 0.00	Poor Depth to bedrock Slope	0.00 0.98	Poor Depth to bedrock Slope Too clayey Rock fragments	0.00 0.00 0.00 0.04
DsF: Descalabrado-----	90	Poor Droughty Depth to bedrock Too clayey	0.00 0.00 0.00	Poor Depth to bedrock Slope	0.00 0.00	Poor Slope Depth to bedrock Too clayey Rock fragments	0.00 0.00 0.00 0.04

Soil Survey of San Germán Area, Puerto Rico

Table 16b.--Construction Materials (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
EcD:							
El Cacique-----	60	Poor Droughty Depth to bedrock Too clayey	0.00 0.00 0.92	Poor Depth to bedrock Low strength Shrink-swell	0.00 0.00 0.87	Poor Depth to bedrock Slope Too clayey	0.00 0.16 0.92
La Taína-----	30	Poor Depth to bedrock Droughty Too clayey	0.00 0.00 0.00	Poor Depth to bedrock Shrink-swell	0.00 0.87	Poor Rock fragments Depth to bedrock Too clayey Slope	0.00 0.00 0.00 0.16
EcF:							
El Cacique-----	60	Poor Droughty Depth to bedrock Too clayey	0.00 0.00 0.92	Poor Depth to bedrock Low strength Slope Shrink-swell	0.00 0.00 0.00 0.87	Poor Slope Depth to bedrock Too clayey	0.00 0.00 0.92
La Taína-----	30	Poor Depth to bedrock Droughty Too clayey	0.00 0.00 0.00	Poor Depth to bedrock Slope Shrink-swell	0.00 0.00 0.87	Poor Slope Rock fragments Depth to bedrock Too clayey	0.00 0.00 0.00 0.00
EcG:							
El Cacique-----	60	Poor Droughty Depth to bedrock Too clayey	0.00 0.00 0.92	Poor Depth to bedrock Slope Low strength Shrink-swell	0.00 0.00 0.00 0.87	Poor Slope Depth to bedrock Too clayey	0.00 0.00 0.92
La Taína-----	30	Poor Depth to bedrock Droughty Too clayey	0.00 0.00 0.00	Poor Depth to bedrock Slope Shrink-swell	0.00 0.00 0.87	Poor Slope Rock fragments Depth to bedrock Too clayey	0.00 0.00 0.00 0.00
Edd:							
El Descanso-----	50	Poor Too clayey Depth to bedrock Droughty	0.00 0.00 0.00	Poor Depth to bedrock	0.00	Poor Too clayey Depth to bedrock Slope	0.00 0.00 0.16
Hoconuco-----	45	Poor Too clayey Droughty Depth to bedrock Too acid	0.00 0.00 0.00 0.61	Poor Depth to bedrock Low strength	0.00 0.00	Poor Too clayey Depth to bedrock Slope	0.00 0.00 0.16
EdF:							
El Descanso-----	50	Poor Too clayey Depth to bedrock Droughty	0.00 0.00 0.00	Poor Depth to bedrock Slope	0.00 0.00	Poor Slope Too clayey Depth to bedrock	0.00 0.00 0.00
Hoconuco-----	45	Poor Too clayey Droughty Depth to bedrock Too acid	0.00 0.00 0.00 0.61	Poor Depth to bedrock Low strength Slope	0.00 0.00 0.00	Poor Slope Too clayey Depth to bedrock	0.00 0.00 0.00

Soil Survey of San Germán Area, Puerto Rico

Table 16b.--Construction Materials (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
EdG: El Descanso-----	50	Poor Too clayey Depth to bedrock Droughty	0.00 0.00 0.00	Poor Depth to bedrock Slope	0.00 0.00	Poor Slope Too clayey Depth to bedrock	0.00 0.00 0.00
Hoconuco-----	45	Poor Too clayey Droughty Depth to bedrock Too acid	0.00 0.00 0.00 0.00 0.61	Poor Depth to bedrock Slope Low strength	0.00 0.00 0.00	Poor Slope Too clayey Depth to bedrock	0.00 0.00 0.00
EpC: El Papayo-----	95	Poor Droughty Depth to bedrock Too clayey	0.00 0.00 0.00	Poor Depth to bedrock Low strength Shrink-swell	0.00 0.00 0.12	Poor Depth to bedrock Too clayey	0.00 0.00
EpD: El Papayo-----	95	Poor Droughty Depth to bedrock Too clayey	0.00 0.00 0.00	Poor Depth to bedrock Low strength Shrink-swell Slope	0.00 0.00 0.12 0.98	Poor Depth to bedrock Slope Too clayey	0.00 0.00 0.00
EpF: El Papayo-----	95	Poor Droughty Depth to bedrock Too clayey	0.00 0.00 0.00	Poor Depth to bedrock Slope Low strength Shrink-swell	0.00 0.00 0.00 0.12	Poor Slope Depth to bedrock Too clayey	0.00 0.00 0.00
FeA: Fé-----	95	Poor Too clayey Sodium content Organic matter content low Salinity	0.00 0.00 0.29 0.50	Poor Shrink-swell Low strength	0.00 0.00	Poor Too clayey Sodium content Salinity	0.00 0.00 0.00
FrA: Fraternidad-----	90	Poor Too clayey Organic matter content low	0.00 0.18	Poor Shrink-swell	0.00	Poor Too clayey	0.00
FrB: Fraternidad-----	90	Poor Too clayey Organic matter content low	0.00 0.18	Poor Shrink-swell	0.00	Poor Too clayey	0.00
GbF: Guanábano-----	95	Poor Carbonate content Organic matter content low Too clayey Too acid	0.00 0.12 0.88 0.97	Poor Slope	0.00	Poor Slope Rock fragments Hard to reclaim (rock fragments) Too clayey Carbonate content	0.00 0.00 0.00 0.51 0.76

Soil Survey of San Germán Area, Puerto Rico

Table 16b.--Construction Materials (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GhC: Guanajibo-----	90	Poor Droughty Too clayey Too acid	0.00 0.00 0.50	Poor Low strength	0.00	Poor Too clayey Too acid	0.00 0.76
GnA: Guánica-----	80	Poor Too clayey Sodium content Salinity	0.00 0.00 0.21	Poor Shrink-swell Low strength	0.00 0.00	Poor Too clayey Sodium content Salinity	0.00 0.00 0.00
GuB: Guayabo-----	90	Poor Too sandy Wind erosion Organic matter content low Droughty Too acid	0.00 0.00 0.16 0.90 0.99	Good		Poor Too sandy	0.00
GyB: Guayacán-----	90	Poor Organic matter content low Carbonate content Too alkaline	0.00 0.00 0.00	Good		Fair Rock fragments Hard to reclaim (rock fragments) Carbonate content	0.18 0.26 0.74
GyC: Guayacán-----	90	Poor Organic matter content low Carbonate content Too alkaline	0.00 0.00 0.00	Good		Fair Rock fragments Hard to reclaim (rock fragments) Carbonate content Slope	0.18 0.26 0.74 0.96
GyD: Guayacán-----	90	Poor Organic matter content low Carbonate content Too alkaline	0.00 0.00 0.00	Fair Slope	0.98	Poor Slope Rock fragments Hard to reclaim (rock fragments) Carbonate content	0.00 0.18 0.26 0.74
HmD: Humatas-----	80	Poor Too clayey Too acid	0.00 0.05	Poor Low strength Shrink-swell Slope	0.00 0.83 0.98	Poor Too clayey Slope Too acid	0.00 0.00 0.68
HmE: Humatas-----	80	Poor Too clayey Too acid	0.00 0.05	Poor Low strength Slope Shrink-swell	0.00 0.00 0.83	Poor Slope Too clayey Too acid	0.00 0.00 0.68
HmF: Humatas-----	80	Poor Too clayey Too acid	0.00 0.05	Poor Slope Low strength Shrink-swell	0.00 0.00 0.83	Poor Slope Too clayey Too acid	0.00 0.00 0.68

Soil Survey of San Germán Area, Puerto Rico

Table 16b.--Construction Materials (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
JaB: Jácana-----	80	Poor Too clayey Depth to bedrock	0.00 0.79	Poor Depth to bedrock Low strength Shrink-swell	0.00 0.00 0.30	Poor Too clayey Depth to bedrock	0.00 0.79
JaC: Jácana-----	80	Poor Too clayey Depth to bedrock	0.00 0.79	Poor Depth to bedrock Low strength Shrink-swell	0.00 0.00 0.30	Poor Too clayey Depth to bedrock Slope	0.00 0.79 0.96
JBA: Joyuda-----	50	Good		Poor Wetness depth	0.00	Poor Wetness depth Organic matter content high	0.00 0.00
Atolladero-----	30	Poor Salinity Too sandy Carbonate content Droughty	0.00 0.08 0.08 0.50	Fair Wetness depth	0.14	Poor Salinity Too sandy Carbonate content Wetness depth	0.00 0.08 0.08 0.14
Bajura-----	20	Poor Too clayey Organic matter content low	0.00 0.15	Poor Wetness depth Shrink-swell Low strength	0.00 0.00 0.00	Poor Too clayey Wetness depth	0.00 0.00
LcE: La Covana-----	60	Poor Droughty Carbonate content Depth to cemented pan Too clayey	0.00 0.00 0.00 0.00	Poor Depth to cemented pan Slope Shrink-swell	0.00 0.50 0.87	Poor Rock fragments Depth to cemented pan Carbonate content Slope Too clayey	0.00 0.00 0.00 0.00 0.00
Limestone outcrop--	20	Not rated		Not rated		Not rated	
Seboruco-----	15	Poor Carbonate content Droughty	0.00 0.00	Fair Slope	0.50	Poor Carbonate content Slope Rock fragments	0.00 0.00 0.00
LdA: La Luna-----	90	Fair Too clayey Sodium content	0.02 0.97	Poor Low strength	0.00	Fair Too clayey Sodium content	0.02 0.98
LeF: La Tea-----	70	Poor Too clayey Droughty Depth to bedrock	0.00 0.00 0.00	Poor Depth to bedrock Low strength Slope	0.00 0.00 0.00	Poor Slope Too clayey Depth to bedrock Rock fragments	0.00 0.00 0.00 0.76
LfC: Landfill-----	100	Not rated		Not rated		Not rated	

Soil Survey of San Germán Area, Puerto Rico

Table 16b.--Construction Materials (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LkB: Lares-----	80	Poor Too clayey Organic matter content low Too acid	0.00 0.02 0.16	Poor Low strength Shrink-swell	0.00 0.87	Poor Too clayey Too acid	0.00 0.88
LnA: Llanos Costa-----	75	Poor Too clayey Organic matter content low Too acid	0.00 0.48 0.74	Fair Shrink-swell	0.87	Poor Rock fragments Too clayey Hard to reclaim (rock fragments)	0.00 0.00 0.39
LnB: Llanos Costa-----	75	Poor Too clayey Organic matter content low Too acid	0.00 0.48 0.74	Fair Shrink-swell	0.87	Poor Rock fragments Too clayey Hard to reclaim (rock fragments)	0.00 0.00 0.39
LnC: Llanos Costa-----	75	Poor Too clayey Organic matter content low Too acid	0.00 0.48 0.74	Fair Shrink-swell	0.87	Poor Rock fragments Too clayey Hard to reclaim (rock fragments)	0.00 0.00 0.39
LpG: Los Penones-----	60	Poor Droughty Depth to bedrock	0.00 0.00	Poor Depth to bedrock Slope	0.00 0.00	Poor Slope Organic matter content high Depth to bedrock	0.00 0.00 0.00
Limestone outcrop--	40	Not rated		Not rated		Not rated	
MaB: Mabí-----	70	Poor Too clayey Too acid Organic matter content low	0.00 0.39 0.88	Poor Shrink-swell Low strength Wetness depth	0.00 0.00 0.14	Poor Too clayey Wetness depth	0.00 0.14
MbA: Maguayo-----	80	Poor Too clayey Organic matter content low Too acid	0.00 0.19 0.84	Fair Shrink-swell	0.22	Poor Too clayey Rock fragments	0.00 0.98
MbC: Maguayo-----	80	Poor Too clayey Organic matter content low Too acid	0.00 0.19 0.84	Fair Shrink-swell	0.22	Poor Too clayey Rock fragments	0.00 0.98

Soil Survey of San Germán Area, Puerto Rico

Table 16b.--Construction Materials (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
McF: Malaya-----	90	Poor Droughty Depth to bedrock Too clayey Too acid	0.00 0.00 0.00 0.97	Poor Depth to bedrock Slope	0.00 0.00	Poor Slope Depth to bedrock Too clayey	0.00 0.00 0.00
MDA: Manglillo-----	50	Good		Poor Wetness depth Low strength	0.00 0.00	Poor Wetness depth Organic matter content high	0.00 0.00
Boquerón-----	30	Poor Too clayey	0.00	Poor Wetness depth Low strength Shrink-swell	0.00 0.00 0.12	Poor Wetness depth Too clayey	0.00 0.00
Serrano-----	20	Poor Wind erosion Sodium content Droughty Salinity Organic matter content low	0.00 0.00 0.00 0.50 0.88	Poor Wetness depth	0.00	Poor Wetness depth Sodium content Salinity Rock fragments	0.00 0.00 0.00 0.97
MeA: Maní-----	80	Poor Too clayey Organic matter content low Too acid	0.00 0.50 0.95	Poor Low strength Shrink-swell Wetness depth	0.00 0.38 0.53	Poor Too clayey Wetness depth	0.00 0.53
MfF: Maresúa-----	80	Poor Too clayey Droughty Depth to bedrock	0.00 0.05 0.21	Poor Depth to bedrock Slope Shrink-swell	0.00 0.00 0.99	Poor Slope Too clayey Rock fragments Depth to bedrock	0.00 0.00 0.00 0.21
MgF: Maresúa-----	40	Poor Too clayey Droughty Depth to bedrock	0.00 0.05 0.21	Poor Depth to bedrock Slope Shrink-swell	0.00 0.00 0.99	Poor Slope Too clayey Rock fragments Depth to bedrock	0.00 0.00 0.00 0.21
Serpentinite outcrop-----	40	Not rated		Not rated		Not rated	
MiD: Mariana-----	95	Poor Too acid Too clayey Organic matter content low	0.00 0.00 0.97	Poor Low strength Shrink-swell Slope	0.00 0.87 0.98	Poor Slope Too clayey Too acid	0.00 0.00 0.32

Soil Survey of San Germán Area, Puerto Rico

Table 16b.--Construction Materials (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MiE: Mariana-----	95	Poor Too acid Too clayey Organic matter content low	0.00 0.00 0.97	Poor Low strength Slope Shrink-swell	0.00 0.00 0.87	Poor Slope Too clayey Too acid	0.00 0.00 0.32
MkF: Maricao-----	80	Poor Too clayey Too acid	0.00 0.01	Poor Low strength Slope Shrink-swell	0.00 0.00 0.99	Poor Slope Too clayey Too acid	0.00 0.00 0.68
MkG: Maricao-----	80	Poor Too clayey Too acid	0.00 0.01	Poor Slope Low strength Shrink-swell	0.00 0.00 0.99	Poor Slope Too clayey Too acid	0.00 0.00 0.68
MnA: Melones-----	95	Poor Sodium content Too clayey Salinity Carbonate content	0.00 0.00 0.52 0.54	Poor Low strength Shrink-swell	0.00 0.13	Poor Sodium content Too clayey Salinity	0.00 0.00 0.32
MnC: Melones-----	95	Poor Sodium content Too clayey Salinity Carbonate content	0.00 0.00 0.52 0.54	Poor Low strength Shrink-swell	0.00 0.13	Poor Sodium content Too clayey Salinity Slope	0.00 0.00 0.32 0.96
MoB: Montalva-----	80	Poor Too clayey Depth to bedrock Droughty	0.00 0.71 0.99	Poor Low strength Depth to bedrock Shrink-swell	0.00 0.00 0.21	Poor Too clayey Depth to bedrock	0.00 0.71
MoC: Montalva-----	80	Poor Too clayey Depth to bedrock Droughty	0.00 0.71 0.99	Poor Low strength Depth to bedrock Shrink-swell	0.00 0.00 0.21	Poor Too clayey Depth to bedrock Slope	0.00 0.71 0.96
MqC: Monte grande-----	90	Poor Too clayey Organic matter content low	0.00 0.30	Poor Shrink-swell Wetness depth	0.00 0.89	Poor Too clayey Hard to reclaim (rock fragments) Rock fragments Wetness depth	0.00 0.00 0.00 0.89
MrD: Morado-----	85	Poor Too clayey Depth to bedrock Droughty Organic matter content low	0.00 0.01 0.05 0.88	Poor Low strength Depth to bedrock Slope	0.00 0.00 0.98	Poor Slope Too clayey Depth to bedrock	0.00 0.00 0.01

Soil Survey of San Germán Area, Puerto Rico

Table 16b.--Construction Materials (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MrE: Morado-----	85	Poor Too clayey Depth to bedrock Droughty Organic matter content low	0.00 0.01 0.05 0.88	Poor Low strength Depth to bedrock Slope	0.00 0.00 0.00	Poor Slope Too clayey Depth to bedrock	0.00 0.00 0.01
MrF: Morado-----	85	Poor Too clayey Depth to bedrock Droughty Organic matter content low	0.00 0.01 0.05 0.88	Poor Slope Low strength Depth to bedrock	0.00 0.00 0.00	Poor Slope Too clayey Depth to bedrock	0.00 0.00 0.01
MuC: Múcara-----	80	Fair Droughty Depth to bedrock Organic matter content low	0.02 0.71 0.96	Poor Depth to bedrock Shrink-swell	0.00 0.87	Fair Rock fragments Depth to bedrock Hard to reclaim (dense layer) Slope	0.50 0.71 0.71 0.96
MuD: Múcara-----	80	Fair Droughty Depth to bedrock Organic matter content low	0.02 0.71 0.96	Poor Depth to bedrock Shrink-swell Slope	0.00 0.87 0.98	Poor Slope Rock fragments Depth to bedrock Hard to reclaim (dense layer)	0.00 0.50 0.71 0.71
MuE: Múcara-----	80	Fair Droughty Depth to bedrock Organic matter content low	0.02 0.71 0.96	Poor Depth to bedrock Slope Shrink-swell	0.00 0.00 0.87	Poor Slope Rock fragments Depth to bedrock Hard to reclaim (dense layer)	0.00 0.50 0.71 0.71
MuF: Múcara-----	80	Fair Droughty Depth to bedrock Organic matter content low	0.02 0.71 0.96	Poor Slope Depth to bedrock Shrink-swell	0.00 0.00 0.87	Poor Slope Rock fragments Depth to bedrock Hard to reclaim (dense layer)	0.00 0.50 0.71 0.71
NpD: Nipe-----	95	Poor Too clayey Organic matter content low Too acid	0.00 0.40 0.50	Poor Low strength	0.00	Poor Too clayey Slope Too acid	0.00 0.16 0.99
OrA: Olivares-----	95	Poor Too clayey Droughty	0.00 0.99	Poor Low strength Shrink-swell	0.00 0.87	Poor Too clayey	0.00

Soil Survey of San Germán Area, Puerto Rico

Table 16b.--Construction Materials (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
PaA: Palmarejo-----	90	Poor Too clayey Too acid	0.00 0.08	Poor Low strength	0.00	Poor Too clayey Too acid	0.00 0.59
PaB: Palmarejo-----	90	Poor Too clayey Too acid	0.00 0.08	Poor Low strength	0.00	Poor Too clayey Too acid	0.00 0.59
PaC: Palmarejo-----	90	Poor Too clayey Too acid	0.00 0.08	Poor Low strength	0.00	Poor Too clayey Too acid	0.00 0.59
PgA: Parguera-----	80	Poor Carbonate content Organic matter content low Too clayey	0.00 0.50 0.66	Poor Low strength	0.00	Poor Rock fragments Too clayey Carbonate content	0.00 0.53 0.92
PgB: Parguera-----	80	Poor Carbonate content Organic matter content low Too clayey	0.00 0.50 0.66	Poor Low strength	0.00	Poor Rock fragments Too clayey Carbonate content	0.00 0.53 0.92
PsF: Pitahaya-----	60	Poor Droughty Carbonate content Depth to bedrock Too clayey	0.00 0.00 0.00 0.00	Poor Depth to bedrock Slope	0.00 0.00	Poor Slope Carbonate content Rock fragments Depth to bedrock Too clayey	0.00 0.00 0.00 0.00 0.00
Limestone outcrop--	20	Not rated		Not rated		Not rated	
Seboruco-----	15	Poor Carbonate content Droughty	0.00 0.00	Poor Slope	0.00	Poor Slope Carbonate content Rock fragments	0.00 0.00 0.00
PsG: Pitahaya-----	60	Poor Droughty Carbonate content Depth to bedrock Too clayey	0.00 0.00 0.00 0.00	Poor Depth to bedrock Slope	0.00 0.00	Poor Slope Carbonate content Rock fragments Depth to bedrock Too clayey	0.00 0.00 0.00 0.00 0.00
Limestone outcrop--	20	Not rated		Not rated		Not rated	
Seboruco-----	15	Poor Carbonate content Droughty	0.00 0.00	Poor Slope	0.00	Poor Slope Carbonate content Rock fragments	0.00 0.00 0.00
Pt: Pits and quarries--	100	Not rated		Not rated		Not rated	

Soil Survey of San Germán Area, Puerto Rico

Table 16b.--Construction Materials (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
PzB: Pozo Blanco-----	95	Poor Stone content Carbonate content Too clayey Organic matter content low	0.00 0.00 0.00 0.88	Poor Stone content	0.00	Poor Too clayey Carbonate content	0.00 0.66
PzC: Pozo Blanco-----	95	Poor Stone content Carbonate content Too clayey Organic matter content low	0.00 0.00 0.00 0.88	Poor Stone content	0.00	Poor Too clayey Carbonate content Slope	0.00 0.66 0.96
PzD: Pozo Blanco-----	95	Poor Stone content Carbonate content Too clayey Organic matter content low	0.00 0.00 0.00 0.88	Poor Stone content Slope	0.00 0.98	Poor Slope Too clayey Carbonate content	0.00 0.00 0.66
QbD: Quebrada-----	95	Poor Depth to bedrock Too clayey Droughty	0.00 0.00 0.05	Poor Depth to bedrock Low strength Shrink-swell Slope	0.00 0.00 0.12 0.98	Poor Depth to bedrock Slope Too clayey	0.00 0.00 0.00
QbE: Quebrada-----	95	Poor Depth to bedrock Too clayey Droughty	0.00 0.00 0.05	Poor Depth to bedrock Low strength Slope Shrink-swell	0.00 0.00 0.00 0.12	Poor Slope Depth to bedrock Too clayey	0.00 0.00 0.00
QbF: Quebrada-----	95	Poor Depth to bedrock Too clayey Droughty	0.00 0.00 0.05	Poor Depth to bedrock Slope Low strength Shrink-swell	0.00 0.00 0.00 0.12	Poor Slope Depth to bedrock Too clayey	0.00 0.00 0.00
ReA: Reilly-----	95	Poor Too sandy Droughty Organic matter content low	0.00 0.00 0.60	Fair Wetness depth	0.89	Poor Too sandy Hard to reclaim (rock fragments) Rock fragments Wetness depth	0.00 0.00 0.00 0.89
RoD: Rosario-----	80	Poor Too clayey Depth to bedrock Too acid Droughty	0.00 0.71 0.80 0.94	Poor Low strength Depth to bedrock Shrink-swell	0.00 0.00 0.87	Poor Slope Too clayey Depth to bedrock	0.00 0.00 0.71

Soil Survey of San Germán Area, Puerto Rico

Table 16b.--Construction Materials (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
RoE: Rosario-----	80	Poor Too clayey Depth to bedrock Too acid Droughty	0.00 0.71 0.80 0.94	Poor Low strength Depth to bedrock Slope Shrink-swell	0.00 0.00 0.00 0.87	Poor Slope Too clayey Depth to bedrock	0.00 0.00 0.71
RoF: Rosario-----	80	Poor Too clayey Depth to bedrock Too acid Droughty	0.00 0.71 0.80 0.94	Poor Slope Low strength Depth to bedrock Shrink-swell	0.00 0.00 0.00 0.87	Poor Slope Too clayey Depth to bedrock	0.00 0.00 0.71
RuF: Rubias-----	60	Fair Too clayey Depth to bedrock Droughty	0.08 0.14 0.52	Poor Depth to bedrock Slope Shrink-swell	0.00 0.00 0.98	Poor Slope Too clayey Depth to bedrock Rock fragments	0.00 0.08 0.14 0.41
Chiquito-----	30	Poor Depth to bedrock Droughty Organic matter content low Too clayey	0.00 0.01 0.99 0.99	Poor Depth to bedrock Slope Low strength	0.00 0.00 0.00	Poor Slope Depth to bedrock Rock fragments Too clayey	0.00 0.00 0.00 0.77
RuG: Rubias-----	60	Fair Too clayey Depth to bedrock Droughty	0.08 0.14 0.52	Poor Depth to bedrock Slope Shrink-swell	0.00 0.00 0.98	Poor Slope Too clayey Depth to bedrock Rock fragments	0.00 0.08 0.14 0.41
Chiquito-----	30	Poor Depth to bedrock Droughty Organic matter content low Too clayey	0.00 0.01 0.99 0.99	Poor Depth to bedrock Slope Low strength	0.00 0.00 0.00	Poor Slope Depth to bedrock Rock fragments Too clayey	0.00 0.00 0.00 0.77
Sa: Salt flats, ponded--	100	Not rated		Not rated		Not rated	
Sb: Salt pits-----	100	Not rated		Not rated		Not rated	
ScA: San Anton-----	95	Fair Too clayey	0.10	Good		Fair Too clayey	0.09
SdD: San Germán-----	95	Poor Droughty Carbonate content Depth to bedrock Too clayey	0.00 0.00 0.00 0.08	Poor Depth to bedrock	0.00	Poor Rock fragments Carbonate content Depth to bedrock Too clayey Slope Organic matter content low	0.00 0.00 0.00 0.08 0.16 0.71

Soil Survey of San Germán Area, Puerto Rico

Table 16b.--Construction Materials (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
SdF: San Germán-----	95	Poor Droughty Carbonate content Depth to bedrock Too clayey	0.00 0.00 0.00 0.08	Poor Slope Depth to bedrock	0.00 0.00	Poor Slope Rock fragments Carbonate content Depth to bedrock Too clayey Organic matter content low	0.00 0.00 0.00 0.00 0.08 0.71
SgD: San Germán-----	60	Poor Droughty Carbonate content Depth to bedrock Too clayey	0.00 0.00 0.00 0.08	Poor Depth to bedrock	0.00	Poor Rock fragments Carbonate content Depth to bedrock Too clayey Slope Organic matter content low	0.00 0.00 0.00 0.08 0.16 0.71
Duey-----	40	Poor Droughty Carbonate content Depth to bedrock Too clayey	0.00 0.00 0.00 0.02	Poor Depth to bedrock	0.00	Poor Depth to bedrock Too clayey Carbonate content Slope Rock fragments	0.00 0.02 0.03 0.16 0.18
SgF: San Germán-----	60	Poor Droughty Carbonate content Depth to bedrock Too clayey	0.00 0.00 0.00 0.08	Poor Slope Depth to bedrock	0.00 0.00	Poor Slope Rock fragments Carbonate content Depth to bedrock Too clayey Organic matter content low	0.00 0.00 0.00 0.00 0.08 0.71
Duey-----	40	Poor Droughty Carbonate content Depth to bedrock Too clayey	0.00 0.00 0.00 0.02	Poor Depth to bedrock Slope	0.00 0.00	Poor Slope Depth to bedrock Too clayey Carbonate content Rock fragments	0.00 0.00 0.00 0.02 0.03 0.18
SiA: Santa Isabel-----	95	Poor Too clayey	0.00	Poor Shrink-swell Low strength	0.00 0.00	Poor Too clayey	0.00
SmE: Santa Marta-----	95	Poor Too clayey Too acid Depth to bedrock	0.00 0.74 0.97	Poor Low strength Depth to bedrock Slope	0.00 0.00 0.00	Poor Slope Rock fragments Too clayey Depth to bedrock	0.00 0.00 0.00 0.97
SoC: Seboruco-----	90	Poor Carbonate content Droughty	0.00 0.00	Good		Poor Carbonate content Rock fragments	0.00 0.00

Soil Survey of San Germán Area, Puerto Rico

Table 16b.--Construction Materials (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
SsB: Sosa-----	90	Poor Too clayey Organic matter content low Too acid Droughty	0.00 0.18 0.80 0.88	Good		Poor Too clayey	0.00
SsC: Sosa-----	90	Poor Too clayey Organic matter content low Too acid Droughty	0.00 0.18 0.80 0.88	Good		Poor Too clayey	0.00
TeA: Teresa-----	95	Poor Too clayey Sodium content Organic matter content low Salinity	0.00 0.10 0.18 0.80	Poor Low strength Shrink-swell	0.00 0.16	Poor Too clayey Sodium content Salinity	0.00 0.10 0.50
TfA: Teresa, ponded----	95	Poor Too clayey Sodium content Organic matter content low Salinity	0.00 0.10 0.18 0.80	Poor Low strength Shrink-swell	0.00 0.16	Poor Too clayey Sodium content Salinity	0.00 0.10 0.50
ToA: Toa-----	90	Poor Too clayey	0.00	Poor Low strength Shrink-swell	0.00 0.98	Poor Too clayey	0.00
Ua: Urban land-----	100	Not rated		Not rated		Not rated	
UdB: Urban land-----	85	Not rated		Not rated		Not rated	
Bahía-----	10	Poor Wind erosion Too sandy Organic matter content low Too acid	0.00 0.02 0.19 0.46	Good		Fair Too sandy	0.02
UgB: Urban land-----	85	Not rated		Not rated		Not rated	
Guayabo-----	10	Poor Too sandy Wind erosion Organic matter content low Droughty Too acid	0.00 0.00 0.16 0.90 0.99	Good		Poor Too sandy	0.00

Soil Survey of San Germán Area, Puerto Rico

Table 16b.--Construction Materials (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Potential source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
UsC: Urban land-----	80	Not rated		Not rated		Not rated	
Sosa-----	15	Poor Too clayey Organic matter content low Too acid Droughty	0.00 0.18 0.80 0.88	Good		Poor Too clayey	0.00
VaA: Vayas-----	90	Fair Too clayey Organic matter content low Sodium content	0.08 0.15 0.97	Poor Wetness depth Low strength Shrink-swell	0.00 0.00 0.87	Poor Wetness depth Too clayey	0.00 0.05
VoC: Voladora-----	90	Poor Too clayey Too acid	0.00 0.08	Poor Low strength Shrink-swell	0.00 0.96	Poor Too clayey Too acid Slope	0.00 0.50 0.96
VoD: Voladora-----	90	Poor Too clayey Too acid	0.00 0.08	Poor Low strength Shrink-swell Slope	0.00 0.96 0.98	Poor Slope Too clayey Too acid	0.00 0.00 0.50
W: Water-----	100	Not rated		Not rated		Not rated	

Soil Survey of San Germán Area, Puerto Rico

Table 17.--Water Management

[The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table]

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
AbF: Agüeybaná-----	85	Very limited Slope Seepage	1.00 0.19	Somewhat limited Hard to pack	0.86	Very limited Depth to water	1.00
AgD: Aguilita-----	90	Very limited Slope Seepage Depth to bedrock	1.00 0.70 0.01	Very limited Piping	1.00	Very limited Depth to water	1.00
AgF: Aguilita-----	80	Very limited Slope Seepage Depth to bedrock	1.00 0.70 0.01	Very limited Piping	1.00	Very limited Depth to water	1.00
AKA: Aguirre-----	95	Not limited		Very limited Ponding Hard to pack	1.00 1.00	Very limited Depth to water	1.00
AlF: Aljibe-----	40	Very limited Slope Depth to bedrock Seepage	1.00 0.19 0.19	Somewhat limited Thin layer Hard to pack	0.70 0.21	Very limited Depth to water	1.00
Guamá-----	30	Very limited Slope Seepage	1.00 0.70	Somewhat limited Hard to pack	0.02	Very limited Depth to water	1.00
Indiera-----	25	Very limited Slope Seepage Depth to bedrock	1.00 0.19 0.01	Somewhat limited Hard to pack Thin layer	0.72 0.19	Very limited Depth to water	1.00
AtD: Altamira-----	85	Very limited Seepage Slope Depth to bedrock	1.00 1.00 0.01	Somewhat limited Piping	0.98	Very limited Depth to water	1.00
AtF: Altamira-----	85	Very limited Slope Seepage Depth to bedrock	1.00 1.00 0.01	Somewhat limited Piping	0.98	Very limited Depth to water	1.00
BaB: Bahía-----	90	Very limited Seepage	1.00	Somewhat limited Seepage	0.23	Very limited Depth to water	1.00

Soil Survey of San Germán Area, Puerto Rico

Table 17.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BhB: Bahía Salinas-----	90	Very limited Seepage	1.00	Somewhat limited Seepage Salinity Piping	0.75 0.50 0.02	Very limited Depth to water	1.00
BjA: Bajura-----	90	Not limited		Very limited Depth to saturated zone Hard to pack	1.00 0.98	Very limited Slow refill Cutbanks cave	1.00 0.10
BkB: Beaches-----	100	Not limited		Not rated		Not rated	
BmC: Bermeja-----	70	Very limited Slope Depth to bedrock	1.00 0.93	Very limited Thin layer Large stones content Seepage	1.00 0.74 0.57	Very limited Depth to water	1.00
Cerro Mariquita-----	20	Very limited Slope Depth to bedrock	1.00 0.99	Very limited Thin layer Seepage Large stones content	1.00 0.57 0.06	Very limited Depth to water	1.00
BmD: Bermeja-----	70	Very limited Slope Depth to bedrock	1.00 0.93	Very limited Thin layer Large stones content Seepage	1.00 0.74 0.57	Very limited Depth to water	1.00
Cerro Mariquita-----	20	Very limited Slope Depth to bedrock	1.00 0.99	Very limited Thin layer Seepage Large stones content	1.00 0.57 0.06	Very limited Depth to water	1.00
BmF: Bermeja-----	75	Very limited Slope Depth to bedrock	1.00 0.93	Very limited Thin layer Large stones content Seepage	1.00 0.74 0.57	Very limited Depth to water	1.00
Cerro Mariquita-----	20	Very limited Slope Depth to bedrock	1.00 0.99	Very limited Thin layer Seepage Large stones content	1.00 0.57 0.06	Very limited Depth to water	1.00
BrF: Bermeja-----	75	Very limited Slope Depth to bedrock	1.00 0.93	Very limited Thin layer Large stones content Seepage	1.00 0.74 0.57	Very limited Depth to water	1.00

Soil Survey of San Germán Area, Puerto Rico

Table 17.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BrF: Rock outcrop-----	15	Very limited Slope Depth to bedrock	1.00 1.00	Not rated		Not rated	
CaC: Cabo Rojo-----	90	Somewhat limited Slope	0.92	Somewhat limited Hard to pack	0.32	Very limited Depth to water	1.00
CbD: Caguabo-----	85	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Thin layer	1.00	Very limited Depth to water	1.00
CbF: Caguabo-----	85	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Thin layer	1.00	Very limited Depth to water	1.00
CeA: Cartagena-----	85	Not limited		Very limited Hard to pack Ponding Salinity	1.00 1.00 0.50	Very limited Depth to water	1.00
CgD: Casabe-----	90	Very limited Slope Depth to bedrock	1.00 0.63	Very limited Thin layer	1.00	Very limited Depth to water	1.00
CgF: Casabe-----	90	Very limited Slope Depth to bedrock	1.00 0.63	Very limited Thin layer	1.00	Very limited Depth to water	1.00
ChA: Cataño-----	95	Very limited Seepage	1.00	Somewhat limited Seepage	0.89	Very limited Depth to water	1.00
CjD: Cerro Gordo-----	90	Very limited Seepage Slope	1.00 1.00	Not limited		Very limited Depth to water	1.00
CkD: Cerro Mariquita-----	80	Very limited Slope Depth to bedrock	1.00 0.99	Very limited Thin layer Seepage Large stones content	1.00 0.57 0.06	Very limited Depth to water	1.00
CkF: Cerro Mariquita-----	80	Very limited Slope Depth to bedrock	1.00 0.99	Very limited Thin layer Seepage Large stones content	1.00 0.57 0.06	Very limited Depth to water	1.00

Soil Survey of San Germán Area, Puerto Rico

Table 17.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
CmB: Coamo-----	90	Very limited Seepage Slope	1.00 1.00	Somewhat limited Seepage	0.03	Very limited Depth to water	1.00
CoA: Coloso-----	90	Not limited		Very limited Hard to pack Depth to saturated zone	1.00 0.99	Very limited Slow refill Cutbanks cave Depth to saturated zone	1.00 0.10 0.01
CsE: Consumo-----	80	Very limited Slope Seepage	1.00 0.70	Somewhat limited Piping	0.02	Very limited Depth to water	1.00
CsF: Consumo-----	80	Very limited Slope Seepage	1.00 0.70	Somewhat limited Piping	0.02	Very limited Depth to water	1.00
CtA: Cortada-----	98	Very limited Seepage	1.00	Somewhat limited Piping	0.03	Very limited Depth to water	1.00
CuD: Costa-----	67	Very limited Slope Depth to bedrock	1.00 0.50	Very limited Thin layer Hard to pack	1.00 0.73	Very limited Depth to water	1.00
Pitahaya-----	25	Somewhat limited Depth to bedrock Slope	0.93 0.32	Very limited Thin layer Seepage	1.00 0.53	Very limited Depth to water	1.00
CuF: Costa-----	67	Very limited Slope Depth to bedrock	1.00 0.50	Very limited Thin layer Hard to pack	1.00 0.73	Very limited Depth to water	1.00
Pitahaya-----	25	Very limited Slope Depth to bedrock	1.00 0.93	Very limited Thin layer Seepage	1.00 0.53	Very limited Depth to water	1.00
CvF: Cuchillas-----	80	Very limited Slope Depth to bedrock	1.00 0.66	Very limited Thin layer	1.00	Very limited Depth to water	1.00
CvG: Cuchillas-----	80	Very limited Slope Depth to bedrock	1.00 0.66	Very limited Thin layer	1.00	Very limited Depth to water	1.00
DeD: Delicias-----	95	Very limited Slope Seepage	1.00 0.70	Somewhat limited Hard to pack	0.15	Very limited Depth to water	1.00

Soil Survey of San Germán Area, Puerto Rico

Table 17.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
DqA: Dique-----	90	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.64	Very limited Depth to water	1.00
DsC: Descalabrado-----	90	Very limited Depth to bedrock Slope	1.00 0.92	Very limited Thin layer	1.00	Very limited Depth to water	1.00
DsD: Descalabrado-----	90	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Thin layer	1.00	Very limited Depth to water	1.00
DsF: Descalabrado-----	90	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Thin layer	1.00	Very limited Depth to water	1.00
EcD: El Cacique-----	60	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Thin layer Hard to pack	1.00 0.22	Very limited Depth to water	1.00
La Taína-----	30	Very limited Slope Depth to bedrock	1.00 0.88	Very limited Thin layer Seepage	1.00 0.62	Very limited Depth to water	1.00
EcF: El Cacique-----	60	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Thin layer Hard to pack	1.00 0.22	Very limited Depth to water	1.00
La Taína-----	30	Very limited Slope Depth to bedrock	1.00 0.88	Very limited Thin layer Seepage	1.00 0.62	Very limited Depth to water	1.00
EcG: El Cacique-----	60	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Thin layer Hard to pack	1.00 0.22	Very limited Depth to water	1.00
La Taína-----	30	Very limited Slope Depth to bedrock	1.00 0.88	Very limited Thin layer Seepage	1.00 0.62	Very limited Depth to water	1.00
Edd: El Descanso-----	50	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Thin layer Organic matter content Hard to pack	1.00 1.00 0.03	Very limited Depth to water	1.00
Hoconuco-----	45	Very limited Slope Depth to bedrock	1.00 0.99	Very limited Thin layer Hard to pack	1.00 0.21	Very limited Depth to water	1.00

Soil Survey of San Germán Area, Puerto Rico

Table 17.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
EdF:							
El Descanso-----	50	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Thin layer Organic matter content Hard to pack	1.00 1.00 0.03	Very limited Depth to water	1.00
Hoconuco-----	45	Very limited Slope Depth to bedrock	1.00 0.99	Very limited Thin layer Hard to pack	1.00 0.21	Very limited Depth to water	1.00
EdG:							
El Descanso-----	50	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Thin layer Organic matter content Hard to pack	1.00 1.00 0.03	Very limited Depth to water	1.00
Hoconuco-----	45	Very limited Slope Depth to bedrock	1.00 0.99	Very limited Thin layer Hard to pack	1.00 0.21	Very limited Depth to water	1.00
EpC:							
El Papayo-----	95	Very limited Depth to bedrock Slope	1.00 0.92	Very limited Thin layer Hard to pack	1.00 0.85	Very limited Depth to water	1.00
EpD:							
El Papayo-----	95	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Thin layer Hard to pack	1.00 0.85	Very limited Depth to water	1.00
EpF:							
El Papayo-----	95	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Thin layer Hard to pack	1.00 0.85	Very limited Depth to water	1.00
FeA:							
Fé-----	95	Not limited		Very limited Hard to pack Salinity	1.00 0.50	Very limited Slow refill Depth to saturated zone Salinity and saturated zone Cutbanks cave	1.00 0.81 0.78 0.10
FrA:							
Fraternidad-----	90	Not limited		Very limited Hard to pack	1.00	Very limited Depth to water	1.00
FrB:							
Fraternidad-----	90	Not limited		Very limited Hard to pack	1.00	Very limited Depth to water	1.00
GbF:							
Guanábano-----	95	Very limited Seepage Slope	1.00 1.00	Not limited		Very limited Depth to water	1.00

Soil Survey of San Germán Area, Puerto Rico

Table 17.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
GhC: Guanajibo-----	90	Somewhat limited Slope	0.92	Very limited Thin layer Piping	0.99 0.98	Very limited Depth to water	1.00
GnA: Guánica-----	80	Not limited		Very limited Ponding Hard to pack Salinity	1.00 1.00 0.79	Very limited Depth to water	1.00
GuB: Guayabo-----	90	Very limited Seepage	1.00	Somewhat limited Seepage	0.92	Very limited Depth to water	1.00
GyB: Guayacán-----	90	Somewhat limited Seepage	0.19	Very limited Salinity Piping	1.00 0.90	Very limited Depth to water	1.00
GyC: Guayacán-----	90	Very limited Slope Seepage	1.00 0.19	Very limited Salinity Piping	1.00 0.90	Very limited Depth to water	1.00
GyD: Guayacán-----	90	Very limited Slope Seepage	1.00 0.19	Very limited Salinity Piping	1.00 0.90	Very limited Depth to water	1.00
HmD: Humatas-----	80	Very limited Slope	1.00	Somewhat limited Hard to pack	0.50	Very limited Depth to water	1.00
HmE: Humatas-----	80	Very limited Slope	1.00	Somewhat limited Hard to pack	0.50	Very limited Depth to water	1.00
HmF: Humatas-----	80	Very limited Slope	1.00	Somewhat limited Hard to pack	0.50	Very limited Depth to water	1.00
JaB: Jácana-----	80	Somewhat limited Slope Depth to bedrock Seepage	0.08 0.06 0.03	Somewhat limited Thin layer Hard to pack	0.77 0.49	Very limited Depth to water	1.00
JaC: Jácana-----	80	Very limited Slope Depth to bedrock Seepage	1.00 0.06 0.03	Somewhat limited Thin layer Hard to pack	0.77 0.49	Very limited Depth to water	1.00
JBA: Joyuda-----	50	Very limited Seepage	1.00	Not rated		Somewhat limited Cutbanks cave	0.10

Soil Survey of San Germán Area, Puerto Rico

Table 17.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
JBA: Atolladero-----	30	Very limited Seepage	1.00	Very limited Depth to saturated zone Salinity Seepage	1.00 1.00 0.11	Very limited Cutbanks cave Salinity and saturated zone	1.00 1.00
Bajura-----	20	Not limited		Very limited Depth to saturated zone Hard to pack	1.00 0.98	Very limited Slow refill Cutbanks cave	1.00 0.10
LCE: La Covana-----	60	Very limited Slope Depth to cemented pan Seepage	1.00 1.00 0.19	Very limited Thin layer Seepage	1.00 0.57	Very limited Depth to water	1.00
Limestone outcrop---	20	Very limited Slope	1.00	Not rated		Not rated	
Seboruco-----	15	Very limited Slope Seepage	1.00 0.19	Somewhat limited Piping	0.14	Very limited Depth to water	1.00
LdA: La Luna-----	90	Not limited		Somewhat limited Piping	0.44	Very limited Depth to water	1.00
LeF: La Tea-----	70	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Thin layer Hard to pack	1.00 1.00	Very limited Depth to water	1.00
LfC: Landfill-----	100	Not limited		Not rated		Not rated	
LkB: Lares-----	80	Somewhat limited Seepage	0.70	Somewhat limited Hard to pack	0.17	Very limited Depth to water	1.00
LnA: Llanos Costa-----	75	Somewhat limited Seepage	0.19	Somewhat limited Seepage	0.01	Very limited Depth to water	1.00
LnB: Llanos Costa-----	75	Somewhat limited Seepage	0.19	Somewhat limited Seepage	0.01	Very limited Depth to water	1.00
LnC: Llanos Costa-----	75	Somewhat limited Slope Seepage	0.92 0.19	Somewhat limited Seepage	0.01	Very limited Depth to water	1.00
LpG: Los Peñones-----	60	Very limited Slope Depth to bedrock	1.00 1.00	Not rated		Very limited Depth to water	1.00

Soil Survey of San Germán Area, Puerto Rico

Table 17.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
LpG: Limestone outcrop---	40	Very limited Slope	1.00	Not rated		Not rated	
MaB: Mabí-----	70	Not limited		Very limited Depth to saturated zone Hard to pack	1.00 1.00	Very limited Slow refill Cutbanks cave	1.00 0.10
MbA: Maguayo-----	80	Not limited		Somewhat limited Hard to pack	0.88	Very limited Depth to water	1.00
MbC: Maguayo-----	80	Very limited Slope	1.00	Somewhat limited Hard to pack	0.88	Very limited Depth to water	1.00
McF: Malaya-----	90	Very limited Slope Depth to bedrock	1.00 0.84	Very limited Thin layer	1.00	Very limited Depth to water	1.00
MDA: Manglillo-----	50	Somewhat limited Seepage	0.70	Very limited Depth to saturated zone Piping	1.00 1.00	Somewhat limited Slow refill Cutbanks cave	0.30 0.10
Boquerón-----	30	Not limited		Very limited Depth to saturated zone Hard to pack	1.00 0.53	Very limited Slow refill Cutbanks cave	1.00 0.10
Serrano-----	20	Very limited Seepage	1.00	Very limited Depth to saturated zone Piping Salinity	1.00 1.00 0.50	Very limited Cutbanks cave Salinity and saturated zone	1.00 0.78
MeA: Maní-----	80	Not limited		Very limited Depth to saturated zone Hard to pack	0.99 0.79	Very limited Slow refill Cutbanks cave Depth to saturated zone	1.00 0.10 0.01
MfF: Maresúa-----	80	Very limited Slope Seepage Depth to bedrock	1.00 0.70 0.23	Somewhat limited Thin layer	0.95	Very limited Depth to water	1.00
MgF: Maresúa-----	40	Very limited Slope Seepage Depth to bedrock	1.00 0.70 0.23	Somewhat limited Thin layer	0.95	Very limited Depth to water	1.00

Soil Survey of San Germán Area, Puerto Rico

Table 17.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MgF: Serpentinite outcrop-----	40	Very limited Slope	1.00	Not rated		Not rated	
MiD: Mariana-----	95	Very limited Slope	1.00	Somewhat limited Hard to pack	0.27	Very limited Depth to water	1.00
MiE: Mariana-----	95	Very limited Slope	1.00	Somewhat limited Hard to pack	0.27	Very limited Depth to water	1.00
MkF: Maricao-----	80	Very limited Slope Seepage	1.00 0.19	Somewhat limited Hard to pack	0.05	Very limited Depth to water	1.00
MkG: Maricao-----	80	Very limited Slope Seepage	1.00 0.19	Somewhat limited Hard to pack	0.05	Very limited Depth to water	1.00
MnA: Melones-----	95	Not limited		Very limited Hard to pack Salinity	1.00 0.48	Very limited Depth to water	1.00
MnC: Melones-----	95	Very limited Slope	1.00	Very limited Hard to pack Salinity	1.00 0.48	Very limited Depth to water	1.00
MoB: Montalva-----	80	Somewhat limited Seepage Depth to bedrock	0.19 0.08	Somewhat limited Hard to pack Thin layer	0.87 0.81	Very limited Depth to water	1.00
MoC: Montalva-----	80	Very limited Slope Seepage Depth to bedrock	1.00 0.19 0.08	Somewhat limited Hard to pack Thin layer	0.87 0.81	Very limited Depth to water	1.00
MqC: Monte grande-----	90	Somewhat limited Slope	0.92	Somewhat limited Depth to saturated zone Seepage	0.86 0.12	Very limited Cutbanks cave Slow refill Depth to saturated zone	1.00 1.00 0.06
MrD: Morado-----	85	Very limited Slope Depth to bedrock	1.00 0.83	Very limited Thin layer Piping	0.99 0.28	Very limited Depth to water	1.00
MrE: Morado-----	85	Very limited Slope Depth to bedrock	1.00 0.83	Very limited Thin layer Piping	0.99 0.28	Very limited Depth to water	1.00

Soil Survey of San Germán Area, Puerto Rico

Table 17.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
MrF: Morado-----	85	Very limited Slope Depth to bedrock	1.00 0.83	Very limited Thin layer Piping	0.99 0.28	Very limited Depth to water	1.00
MuC: Múcara-----	80	Very limited Slope Seepage Depth to bedrock	1.00 0.70 0.08	Somewhat limited Thin layer Seepage	0.81 0.01	Very limited Depth to water	1.00
MuD: Múcara-----	80	Very limited Slope Seepage Depth to bedrock	1.00 0.70 0.08	Somewhat limited Thin layer Seepage	0.81 0.01	Very limited Depth to water	1.00
MuE: Múcara-----	80	Very limited Slope Seepage Depth to bedrock	1.00 0.70 0.08	Somewhat limited Thin layer Seepage	0.81 0.01	Very limited Depth to water	1.00
MuF: Múcara-----	80	Very limited Slope Seepage Depth to bedrock	1.00 0.70 0.08	Somewhat limited Thin layer Seepage	0.81 0.01	Very limited Depth to water	1.00
NpD: Nipe-----	95	Very limited Slope Seepage	1.00 0.19	Not limited		Very limited Depth to water	1.00
OrA: Olivares-----	95	Not limited		Very limited Ponding Hard to pack	1.00 0.87	Very limited Depth to water	1.00
PaA: Palmarejo-----	90	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.22	Very limited Depth to water	1.00
PaB: Palmarejo-----	90	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.22	Very limited Depth to water	1.00
PaC: Palmarejo-----	90	Very limited Slope Seepage	1.00 0.70	Somewhat limited Piping	0.22	Very limited Depth to water	1.00
PgA: Parguera-----	80	Somewhat limited Seepage	0.19	Very limited Hard to pack Seepage	1.00 0.50	Very limited Depth to water	1.00
PgB: Parguera-----	80	Somewhat limited Seepage Slope	0.19 0.08	Very limited Hard to pack Seepage	1.00 0.50	Very limited Depth to water	1.00

Soil Survey of San Germán Area, Puerto Rico

Table 17.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
PsF:							
Pitahaya-----	60	Very limited Slope Depth to bedrock	1.00 0.93	Very limited Thin layer Seepage	1.00 0.53	Very limited Depth to water	1.00
Limestone outcrop---	20	Very limited Slope	1.00	Not rated		Not rated	
Seboruco-----	15	Very limited Slope Seepage	1.00 0.19	Somewhat limited Piping	0.14	Very limited Depth to water	1.00
Psg:							
Pitahaya-----	60	Very limited Slope Depth to bedrock	1.00 0.93	Very limited Thin layer Seepage	1.00 0.53	Very limited Depth to water	1.00
Limestone outcrop---	20	Very limited Slope	1.00	Not rated		Not rated	
Seboruco-----	15	Very limited Slope Seepage	1.00 0.19	Somewhat limited Piping	0.14	Very limited Depth to water	1.00
Pt:							
Pits and quarries---	100	Not rated		Not rated		Not rated	
PzB:							
Pozo Blanco-----	95	Somewhat limited Seepage	0.70	Very limited Large stones content Piping	1.00 1.00	Very limited Depth to water	1.00
PzC:							
Pozo Blanco-----	95	Very limited Slope Seepage	1.00 0.70	Very limited Large stones content Piping	1.00 1.00	Very limited Depth to water	1.00
PzD:							
Pozo Blanco-----	95	Very limited Slope Seepage	1.00 0.70	Very limited Large stones content Piping	1.00 1.00	Very limited Depth to water	1.00
QbD:							
Quebrada-----	95	Very limited Slope Depth to bedrock	1.00 0.50	Very limited Thin layer Hard to pack	1.00 0.64	Very limited Depth to water	1.00
QbE:							
Quebrada-----	95	Very limited Slope Depth to bedrock	1.00 0.50	Very limited Thin layer Hard to pack	1.00 0.64	Very limited Depth to water	1.00
QbF:							
Quebrada-----	95	Very limited Slope Depth to bedrock	1.00 0.50	Very limited Thin layer Hard to pack	1.00 0.64	Very limited Depth to water	1.00

Soil Survey of San Germán Area, Puerto Rico

Table 17.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
ReA: Reilly-----	95	Very limited Seepage	1.00	Somewhat limited Depth to saturated zone Seepage	0.86 0.31	Very limited Cutbanks cave Depth to saturated zone	1.00 0.06
RoD: Rosario-----	80	Very limited Slope Seepage Depth to bedrock	1.00 0.70 0.29	Somewhat limited Thin layer Hard to pack	0.81 0.08	Very limited Depth to water	1.00
RoE: Rosario-----	80	Very limited Slope Seepage Depth to bedrock	1.00 0.70 0.29	Somewhat limited Thin layer Hard to pack	0.81 0.08	Very limited Depth to water	1.00
RoF: Rosario-----	80	Very limited Slope Seepage Depth to bedrock	1.00 0.70 0.29	Somewhat limited Thin layer Hard to pack	0.81 0.08	Very limited Depth to water	1.00
RuF: Rubias-----	60	Very limited Slope Seepage Depth to bedrock	1.00 0.57 0.27	Somewhat limited Thin layer	0.97	Very limited Depth to water	1.00
Chiquito-----	30	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Thin layer	1.00	Very limited Depth to water	1.00
RuG: Rubias-----	60	Very limited Slope Seepage Depth to bedrock	1.00 0.57 0.27	Somewhat limited Thin layer	0.97	Very limited Depth to water	1.00
Chiquito-----	30	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Thin layer	1.00	Very limited Depth to water	1.00
Sa: Salt flats, ponded---	100	Not limited		Not rated		Not rated	
Sb: Salt pits-----	100	Not limited		Not rated		Not rated	
ScA: San Antón-----	95	Very limited Seepage	1.00	Somewhat limited Piping	0.37	Very limited Depth to water	1.00
SdD: San Germán-----	95	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Thin layer Seepage	1.00 0.60	Very limited Depth to water	1.00

Soil Survey of San Germán Area, Puerto Rico

Table 17.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
SdF: San Germán-----	95	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Thin layer Seepage	1.00 0.60	Very limited Depth to water	1.00
SgD: San Germán-----	60	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Thin layer Seepage	1.00 0.60	Very limited Depth to water	1.00
Duey -----	40	Very limited Slope Depth to bedrock	1.00 0.69	Very limited Thin layer Seepage	1.00 0.85	Very limited Depth to water	1.00
SgF: San Germán-----	60	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Thin layer Seepage	1.00 0.60	Very limited Depth to water	1.00
Duey -----	40	Very limited Slope Depth to bedrock	1.00 0.69	Very limited Thin layer Seepage	1.00 0.85	Very limited Depth to water	1.00
SiA: Santa Isabel-----	95	Not limited		Very limited Hard to pack	0.99	Very limited Depth to water Slow refill	1.00 1.00
SmE: Santa Marta-----	95	Very limited Slope Seepage Depth to bedrock	1.00 0.70 0.02	Somewhat limited Thin layer Seepage	0.61 0.12	Very limited Depth to water	1.00
SoC: Seboruco-----	90	Somewhat limited Slope Seepage	0.92 0.19	Somewhat limited Piping	0.14	Very limited Depth to water	1.00
SsB: Sosa-----	90	Somewhat limited Seepage Slope	0.24 0.08	Somewhat limited Seepage	0.06	Very limited Depth to water	1.00
SsC: Sosa-----	90	Very limited Slope Seepage	1.00 0.24	Somewhat limited Seepage	0.06	Very limited Depth to water	1.00
TeA: Teresa-----	95	Not limited		Very limited Hard to pack Salinity	1.00 0.20	Very limited Depth to water	1.00
TfA: Teresa, ponded-----	95	Not limited		Very limited Hard to pack Ponding Salinity	1.00 1.00 0.20	Very limited Depth to water	1.00

Soil Survey of San Germán Area, Puerto Rico

Table 17.--Water Management--Continued

Map symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
ToA: Toa-----	90	Somewhat limited Seepage	0.70	Not limited		Very limited Depth to water	1.00
Ua: Urban land-----	100	Not rated		Not rated		Not rated	
Ubb: Urban land-----	85	Not limited		Not rated		Not rated	
Bahía-----	10	Very limited Seepage	1.00	Somewhat limited Seepage	0.23	Very limited Depth to water	1.00
UgB: Urban land-----	85	Not limited		Not rated		Not rated	
Guayabo-----	10	Very limited Seepage	1.00	Somewhat limited Seepage	0.92	Very limited Depth to water	1.00
UsC: Urban land-----	80	Somewhat limited Slope	0.68	Not rated		Not rated	
Sosa-----	15	Very limited Slope Seepage	1.00 0.24	Somewhat limited Seepage	0.06	Very limited Depth to water	1.00
VaA: Vayas-----	90	Not limited		Very limited Depth to saturated zone Hard to pack	1.00 0.83	Very limited Slow refill Cutbanks cave	1.00 0.10
VoC: Voladora-----	90	Very limited Slope	1.00	Not limited		Very limited Depth to water	1.00
VoD: Voladora-----	90	Very limited Slope	1.00	Not limited		Very limited Depth to water	1.00
W: Water-----	100	Not rated		Not rated		Not rated	

Soil Survey of San Germán Area, Puerto Rico

Table 18a.--Agricultural Waste Management (Part 1)

[The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table]

Map symbol and soil name	Pct. of map unit	Application of manure and food- processing waste		Application of sewage sludge	
		Rating class and limiting features	Value	Rating class and limiting features	Value
AbF: Agüeybaná-----	85	Very limited Slope Slow water movement Too acid Low adsorption Runoff	1.00 1.00 0.78 0.66 0.40	Very limited Slow water movement Slope Too acid Low adsorption	1.00 1.00 1.00 1.00 0.99
AgD: Aguilita-----	90	Somewhat limited Slope Sodium content	0.84 0.02	Somewhat limited Slope Sodium content	0.84 0.02
AgF: Aguilita-----	80	Very limited Slope Sodium content	1.00 0.02	Very limited Slope Sodium content	1.00 0.02
AKA: Aguirre-----	95	Very limited Slow water movement Ponding Runoff	1.00 1.00 0.40	Very limited Slow water movement Ponding	1.00 1.00
AlF: Aljibe-----	40	Very limited Slope Filtering capacity Droughty Too acid Depth to bedrock	1.00 0.99 0.36 0.22 0.10	Very limited Slope Filtering capacity Too acid Droughty Depth to bedrock	1.00 0.99 0.77 0.36 0.10
Guamá-----	30	Very limited Slope Filtering capacity Too acid	1.00 0.99 0.50	Very limited Slope Filtering capacity Too acid	1.00 0.99 0.99
Indiera-----	25	Very limited Slope Filtering capacity Too acid	1.00 0.99 0.78	Very limited Slope Too acid Filtering capacity	1.00 1.00 0.99

Soil Survey of San Germán Area, Puerto Rico

Table 18a.--Agricultural Waste Management (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food- processing waste		Application of sewage sludge	
		Rating class and limiting features	Value	Rating class and limiting features	Value
AtD: Altamira-----	85	Very limited Slow water movement Runoff Sodium content Slope	1.00 0.40 0.02 0.01	Very limited Slow water movement Sodium content Slope	1.00 0.02 0.01
AtF: Altamira-----	85	Very limited Slope Slow water movement Runoff Sodium content	1.00 1.00 0.40 0.02	Very limited Slow water movement Slope Sodium content	1.00 1.00 0.02
BaB: Bahía-----	90	Very limited Filtering capacity Leaching Too acid	0.99 0.45 0.37	Very limited Filtering capacity Too acid	0.99 0.96
BhB: Bahía Salinas-----	90	Very limited Filtering capacity Droughty Salinity Leaching Sodium content	1.00 1.00 0.78 0.45 0.08	Very limited Droughty Filtering capacity Salinity Sodium content	1.00 1.00 1.00 0.08
BjA: Bajura-----	90	Very limited Slow water movement Depth to saturated zone Flooding Runoff	1.00 1.00 1.00 0.40	Very limited Slow water movement Depth to saturated zone Flooding	1.00 1.00 1.00
BkB: Beaches-----	100	Not rated		Not rated	
BmC: Bermeja-----	70	Very limited Cobble content Droughty Depth to bedrock Too acid Slope	1.00 1.00 1.00 0.14 0.01	Very limited Droughty Cobble content Depth to bedrock Too acid Slope	1.00 1.00 1.00 0.55 0.01
Cerro Mariquita-----	20	Very limited Depth to bedrock Droughty Runoff Slope	1.00 1.00 0.40 0.01	Very limited Droughty Depth to bedrock Slope	1.00 1.00 0.01

Soil Survey of San Germán Area, Puerto Rico

Table 18a.--Agricultural Waste Management (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food- processing waste		Application of sewage sludge	
		Rating class and limiting features	Value	Rating class and limiting features	Value
BmD: Bermeja-----	70	Very limited Cobble content Droughty Depth to bedrock Slope Too acid	 1.00 1.00 1.00 1.00 0.14	Very limited Droughty Cobble content Depth to bedrock Slope Too acid	 1.00 1.00 1.00 1.00 0.55
Cerro Mariquita-----	20	Very limited Depth to bedrock Droughty Slope Runoff	 1.00 1.00 1.00 0.40	Very limited Droughty Depth to bedrock Slope	 1.00 1.00 1.00
BmF: Bermeja-----	75	Very limited Slope Cobble content Droughty Depth to bedrock Too acid	 1.00 1.00 1.00 1.00 0.14	Very limited Droughty Cobble content Slope Depth to bedrock Too acid	 1.00 1.00 1.00 1.00 0.55
Cerro Mariquita-----	20	Very limited Slope Depth to bedrock Droughty Runoff	 1.00 1.00 1.00 0.40	Very limited Droughty Depth to bedrock Slope	 1.00 1.00 1.00
BrF: Bermeja-----	75	Very limited Slope Cobble content Droughty Depth to bedrock Too acid	 1.00 1.00 1.00 1.00 0.14	Very limited Droughty Cobble content Slope Depth to bedrock Too acid	 1.00 1.00 1.00 1.00 0.55
Rock outcrop-----	15	Not rated		Not rated	
CaC: Cabo Rojo-----	90	Very limited Slow water movement Runoff Too acid	 1.00 0.40 0.22	Very limited Slow water movement Too acid	 1.00 0.77
CbD: Caguabo-----	85	Very limited Droughty Depth to bedrock Slope Runoff	 1.00 1.00 1.00 0.40	Very limited Droughty Depth to bedrock Slope	 1.00 1.00 1.00
CbF: Caguabo-----	85	Very limited Slope Droughty Depth to bedrock Runoff	 1.00 1.00 1.00 0.40	Very limited Droughty Slope Depth to bedrock	 1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18a.--Agricultural Waste Management (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food- processing waste		Application of sewage sludge	
		Rating class and limiting features	Value	Rating class and limiting features	Value
CeA: Cartagena-----	85	Very limited Slow water movement Sodium content Ponding Salinity Runoff	1.00 1.00 1.00 0.78 0.40	Very limited Slow water movement Sodium content Ponding Salinity	1.00 1.00 1.00 1.00 0.50
CgD: Casabe-----	90	Very limited Slow water movement Depth to bedrock Droughty Slope Runoff	1.00 1.00 1.00 1.00 1.00 0.40	Very limited Droughty Slow water movement Depth to bedrock Slope	1.00 1.00 1.00 1.00 1.00
CgF: Casabe-----	90	Very limited Slope Slow water movement Depth to bedrock Droughty Runoff	1.00 1.00 1.00 1.00 1.00 0.40	Very limited Droughty Slow water movement Depth to bedrock Slope	1.00 1.00 1.00 1.00 1.00
ChA: Cataño-----	95	Somewhat limited Leaching Droughty	0.45 0.14	Somewhat limited Droughty	0.14
CjD: Cerro Gordo-----	90	Very limited Filtering capacity Too acid Slope	0.99 0.68 0.63	Very limited Too acid Filtering capacity Slope	1.00 0.99 0.63
CkD: Cerro Mariquita-----	80	Very limited Depth to bedrock Droughty Slope Runoff	1.00 1.00 1.00 1.00 0.40	Very limited Droughty Depth to bedrock Slope	1.00 1.00 1.00 1.00
CkF: Cerro Mariquita-----	80	Very limited Slope Depth to bedrock Droughty Runoff	1.00 1.00 1.00 1.00 0.40	Very limited Droughty Depth to bedrock Slope	1.00 1.00 1.00 1.00
CmB: Coamo-----	90	Somewhat limited Slow water movement Slope	0.50 0.04	Somewhat limited Slow water movement Slope	0.37 0.04

Soil Survey of San Germán Area, Puerto Rico

Table 18a.--Agricultural Waste Management (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food- processing waste		Application of sewage sludge	
		Rating class and limiting features	Value	Rating class and limiting features	Value
CoA: Coloso-----	90	Very limited Slow water movement Depth to saturated zone Flooding Runoff	1.00 0.99 0.60 0.40	Very limited Slow water movement Flooding Depth to saturated zone	1.00 1.00 0.99
CsE: Consumo-----	80	Very limited Slope Slow water movement Too acid Runoff	1.00 1.00 0.62 0.40	Very limited Slow water movement Slope Too acid	1.00 1.00 1.00
CsF: Consumo-----	80	Very limited Slope Slow water movement Too acid Runoff	1.00 1.00 0.62 0.40	Very limited Slow water movement Slope Too acid	1.00 1.00 1.00
CtA: Cortada-----	98	Somewhat limited Flooding Sodium content	0.60 0.08	Very limited Flooding Sodium content	1.00 0.08
CuD: Costa-----	67	Very limited Slow water movement Droughty Depth to bedrock Slope Runoff	1.00 1.00 1.00 1.00 0.40	Very limited Droughty Slow water movement Depth to bedrock Slope	1.00 1.00 1.00 1.00
Pitahaya-----	25	Very limited Slow water movement Droughty Depth to bedrock Runoff	1.00 1.00 1.00 0.40	Very limited Droughty Slow water movement Depth to bedrock	1.00 1.00 1.00
CuF: Costa-----	67	Very limited Slope Slow water movement Droughty Depth to bedrock Runoff	1.00 1.00 1.00 1.00 0.40	Very limited Droughty Slow water movement Slope Depth to bedrock	1.00 1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18a.--Agricultural Waste Management (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food- processing waste		Application of sewage sludge	
		Rating class and limiting features	Value	Rating class and limiting features	Value
CuF: Pitahaya-----	25	Very limited Slope Slow water movement Droughty Depth to bedrock Runoff	1.00 1.00 1.00 1.00 0.40	Very limited Droughty Slow water movement Slope Depth to bedrock	1.00 1.00 1.00 1.00
CvF: Cuchillas-----	80	Very limited Slope Droughty Depth to bedrock	1.00 1.00 1.00	Very limited Slope Droughty Depth to bedrock	1.00 1.00 1.00
CvG: Cuchillas-----	80	Very limited Slope Droughty Depth to bedrock	1.00 1.00 1.00	Very limited Slope Droughty Depth to bedrock	1.00 1.00 1.00
DeD: Delicias-----	95	Somewhat limited Slope Too acid Low adsorption	0.84 0.62 0.58	Very limited Too acid Slope Low adsorption	1.00 0.84 0.40
DqA: Dique-----	90	Very limited Flooding	1.00	Very limited Flooding	1.00
DsC: Descalabrado-----	90	Very limited Slow water movement Depth to bedrock Droughty Runoff	1.00 1.00 1.00 0.40	Very limited Droughty Slow water movement Depth to bedrock	1.00 1.00 1.00
DsD: Descalabrado-----	90	Very limited Slow water movement Depth to bedrock Droughty Slope Runoff	1.00 1.00 1.00 1.00 0.40	Very limited Droughty Slow water movement Depth to bedrock Slope	1.00 1.00 1.00 1.00
DsF: Descalabrado-----	90	Very limited Slope Slow water movement Depth to bedrock Droughty Runoff	1.00 1.00 1.00 1.00 0.40	Very limited Droughty Slow water movement Depth to bedrock Slope	1.00 1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18a.--Agricultural Waste Management (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food- processing waste		Application of sewage sludge	
		Rating class and limiting features	Value	Rating class and limiting features	Value
EcD: El Cacique-----	60	Very limited Slow water movement Depth to bedrock Droughty Slope Runoff	1.00 1.00 1.00 0.84 0.40	Very limited Droughty Slow water movement Depth to bedrock Slope	1.00 1.00 1.00 0.84
La Taína-----	30	Very limited Slow water movement Depth to bedrock Droughty Slope Runoff	1.00 1.00 1.00 1.00 0.84 0.40	Very limited Slow water movement Depth to bedrock Droughty Slope	1.00 1.00 1.00 1.00 0.84
EcF: El Cacique-----	60	Very limited Slope Slow water movement Depth to bedrock Droughty Runoff	1.00 1.00 1.00 1.00 1.00 0.40	Very limited Droughty Slow water movement Depth to bedrock Slope	1.00 1.00 1.00 1.00
La Taína-----	30	Very limited Slope Slow water movement Depth to bedrock Droughty Runoff	1.00 1.00 1.00 1.00 1.00 0.40	Very limited Slow water movement Slope Depth to bedrock Droughty	1.00 1.00 1.00 1.00 1.00
EcG: El Cacique-----	60	Very limited Slope Slow water movement Depth to bedrock Droughty Runoff	1.00 1.00 1.00 1.00 1.00 0.40	Very limited Droughty Slow water movement Depth to bedrock Slope	1.00 1.00 1.00 1.00
La Taína-----	30	Very limited Slope Slow water movement Depth to bedrock Droughty Runoff	1.00 1.00 1.00 1.00 1.00 0.40	Very limited Slow water movement Slope Depth to bedrock Droughty	1.00 1.00 1.00 1.00 1.00
EdD: El Descanso-----	50	Very limited Depth to bedrock Droughty Filtering capacity Slope	1.00 1.00 0.99 0.84	Very limited Depth to bedrock Droughty Filtering capacity Slope	1.00 1.00 0.99 0.84

Soil Survey of San Germán Area, Puerto Rico

Table 18a.--Agricultural Waste Management (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food- processing waste		Application of sewage sludge	
		Rating class and limiting features	Value	Rating class and limiting features	Value
EdD: Hoconuco-----	45	Very limited Slow water movement Droughty Depth to bedrock Filtering capacity Slope	1.00 1.00 1.00 0.99 0.84	Very limited Droughty Slow water movement Depth to bedrock Filtering capacity Too acid	1.00 1.00 1.00 0.99 0.85
EdF: El Descanso-----	50	Very limited Slope Depth to bedrock Droughty Filtering capacity	1.00 1.00 1.00 0.99	Very limited Depth to bedrock Slope Droughty Filtering capacity	1.00 1.00 1.00 0.99
Hoconuco-----	45	Very limited Slope Slow water movement Droughty Depth to bedrock Filtering capacity	1.00 1.00 1.00 1.00 0.99	Very limited Droughty Slow water movement Slope Depth to bedrock Filtering capacity	1.00 1.00 1.00 1.00 0.99
EdG: El Descanso-----	50	Very limited Slope Depth to bedrock Droughty Filtering capacity	1.00 1.00 1.00 0.99	Very limited Depth to bedrock Slope Droughty Filtering capacity	1.00 1.00 1.00 0.99
Hoconuco-----	45	Very limited Slope Slow water movement Droughty Depth to bedrock Filtering capacity	1.00 1.00 1.00 1.00 0.99	Very limited Droughty Slow water movement Slope Depth to bedrock Filtering capacity	1.00 1.00 1.00 1.00 0.99
EpC: El Papayo-----	95	Very limited Slow water movement Depth to bedrock Droughty Runoff	1.00 1.00 1.00 1.00 0.40	Very limited Droughty Slow water movement Depth to bedrock	1.00 1.00 1.00
EpD: El Papayo-----	95	Very limited Slow water movement Depth to bedrock Droughty Slope Runoff	1.00 1.00 1.00 1.00 0.40	Very limited Droughty Slow water movement Depth to bedrock Slope	1.00 1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18a.--Agricultural Waste Management (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food- processing waste		Application of sewage sludge	
		Rating class and limiting features	Value	Rating class and limiting features	Value
EpF: El Papayo-----	95	Very limited Slope Slow water movement Depth to bedrock Droughty Runoff	1.00 1.00 1.00 1.00 0.40	Very limited Droughty Slow water movement Depth to bedrock Slope	1.00 1.00 1.00 1.00
FeA: Fé-----	95	Very limited Slow water movement Sodium content Salinity Runoff	1.00 1.00 0.78 0.40	Very limited Slow water movement Sodium content Salinity	1.00 1.00 0.50
FrA: Fraternidad-----	90	Very limited Slow water movement Runoff	1.00 0.40	Very limited Slow water movement	1.00
FrB: Fraternidad-----	90	Very limited Slow water movement Runoff	1.00 0.40	Very limited Slow water movement	1.00
GbF: Guanábano-----	95	Very limited Slope Slow water movement Runoff Too acid	1.00 1.00 0.40 0.02	Very limited Slow water movement Slope Too acid	1.00 1.00 0.07
GhC: Guanajibo-----	90	Very limited Slow water movement Droughty Low adsorption Too acid Runoff	1.00 1.00 0.60 0.50 0.40	Very limited Droughty Slow water movement Too acid	1.00 1.00 0.99
GnA: Guánica-----	80	Very limited Slow water movement Ponding Sodium content Runoff Salinity	1.00 1.00 1.00 0.40 0.22	Very limited Slow water movement Ponding Sodium content	1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18a.--Agricultural Waste Management (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food- processing waste		Application of sewage sludge	
		Rating class and limiting features	Value	Rating class and limiting features	Value
GuB: Guayabo-----	90	Very limited Filtering capacity Leaching Droughty	1.00 0.45 0.10	Very limited Filtering capacity Droughty	1.00 0.10
GyB: Guayacán-----	90	Very limited Slow water movement Runoff	1.00 0.40	Very limited Slow water movement	1.00
GyC: Guayacán-----	90	Very limited Slow water movement Runoff Slope	1.00 0.40 0.04	Very limited Slow water movement Slope	1.00 0.04
GyD: Guayacán-----	90	Very limited Slow water movement Slope Runoff	1.00 1.00 0.40	Very limited Slow water movement Slope	1.00 1.00
HmD: Humatas-----	80	Very limited Slow water movement Slope Runoff Too acid	1.00 1.00 0.40 0.22	Very limited Slow water movement Slope Too acid	1.00 1.00 0.77
HmE: Humatas-----	80	Very limited Slope Slow water movement Runoff Too acid	1.00 1.00 0.40 0.22	Very limited Slow water movement Slope Too acid	1.00 1.00 0.77
HmF: Humatas-----	80	Very limited Slope Slow water movement Runoff Too acid	1.00 1.00 0.40 0.22	Very limited Slow water movement Slope Too acid	1.00 1.00 0.77
JaB: Jácana-----	80	Very limited Slow water movement Runoff Depth to bedrock Droughty	1.00 0.40 0.20 0.01	Very limited Slow water movement Depth to bedrock Droughty	1.00 0.20 0.01

Soil Survey of San Germán Area, Puerto Rico

Table 18a.--Agricultural Waste Management (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food- processing waste		Application of sewage sludge	
		Rating class and limiting features	Value	Rating class and limiting features	Value
JaC: Jácana-----	80	Very limited Slow water movement Runoff Depth to bedrock Slope Droughty	1.00 0.40 0.20 0.04 0.01	Very limited Slow water movement Depth to bedrock Slope Droughty	1.00 0.20 0.04 0.01
JBA: Joyuda-----	50	Very limited Depth to saturated zone Flooding Filtering capacity Runoff	1.00 1.00 0.99 0.40	Very limited Depth to saturated zone Flooding Filtering capacity	1.00 1.00 0.99
Atolladero-----	30	Very limited Depth to saturated zone Flooding Filtering capacity Salinity Droughty	1.00 1.00 0.99 0.78 0.50	Very limited Depth to saturated zone Flooding Filtering capacity Droughty Salinity	1.00 1.00 0.99 0.50 0.50
Bajura-----	20	Very limited Slow water movement Depth to saturated zone Flooding Runoff	1.00 1.00 1.00 0.40	Very limited Slow water movement Depth to saturated zone Flooding	1.00 1.00 1.00
LcE: La Covana-----	60	Very limited Slow water movement Depth to cemented pan Droughty Slope Runoff	1.00 1.00 1.00 1.00 0.40	Very limited Droughty Slow water movement Depth to cemented pan Slope	1.00 1.00 1.00 1.00
Limestone outcrop---	20	Not rated		Not rated	
Seboruco-----	15	Very limited Slow water movement Droughty Slope Runoff	1.00 1.00 1.00 0.40	Very limited Slow water movement Droughty Slope	1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18a.--Agricultural Waste Management (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food- processing waste		Application of sewage sludge	
		Rating class and limiting features	Value	Rating class and limiting features	Value
LdA: La Luna-----	90	Very limited Slow water movement Flooding Runoff Sodium content	1.00 0.60 0.40 0.08	Very limited Slow water movement Flooding Sodium content	1.00 1.00 0.08
LeF: La Tea-----	70	Very limited Slope Slow water movement Depth to bedrock Droughty Cobble content	1.00 1.00 1.00 1.00 0.50	Very limited Droughty Slow water movement Depth to bedrock Slope Cobble content	1.00 1.00 1.00 1.00 0.50
LfC: Landfill-----	100	Not rated		Not rated	
LkB: Lares-----	80	Very limited Slow water movement Too acid Runoff	1.00 0.68 0.40	Very limited Slow water movement Too acid	1.00 1.00
LnA: Llanos Costa-----	75	Very limited Slow water movement Runoff Too acid	1.00 0.40 0.18	Very limited Slow water movement Too acid	1.00 0.67
LnB: Llanos Costa-----	75	Very limited Slow water movement Runoff Too acid	1.00 0.40 0.18	Very limited Slow water movement Too acid	1.00 0.67
LnC: Llanos Costa-----	75	Very limited Slow water movement Runoff Too acid	1.00 0.40 0.18	Very limited Slow water movement Too acid	1.00 0.67
LpG: Los Peñones-----	60	Very limited Slope Depth to bedrock Droughty Filtering capacity Runoff	1.00 1.00 1.00 0.99 0.40	Very limited Droughty Depth to bedrock Slope Filtering capacity	1.00 1.00 1.00 0.99
Limestone outcrop---	40	Not rated		Not rated	

Soil Survey of San Germán Area, Puerto Rico

Table 18a.--Agricultural Waste Management (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food- processing waste		Application of sewage sludge	
		Rating class and limiting features	Value	Rating class and limiting features	Value
MaB: Mabí-----	70	Very limited Slow water movement Depth to saturated zone Too acid Runoff	1.00 1.00 0.43 0.40	Very limited Slow water movement Depth to saturated zone Too acid Flooding	1.00 1.00 0.99 0.40
MbA: Maguayo-----	80	Very limited Slow water movement Runoff Too acid	1.00 0.40 0.11	Very limited Slow water movement Too acid	1.00 0.42
MbC: Maguayo-----	80	Very limited Slow water movement Runoff Too acid Slope	1.00 0.40 0.11 0.01	Very limited Slow water movement Too acid Slope	1.00 0.42 0.01
McF: Malaya-----	90	Very limited Slope Slow water movement Depth to bedrock Droughty Runoff	1.00 1.00 1.00 1.00 0.40	Very limited Droughty Slow water movement Depth to bedrock Slope Too acid	1.00 1.00 1.00 1.00 0.07
MDA: Manglillo-----	50	Very limited Slow water movement Depth to saturated zone Flooding Runoff	1.00 1.00 1.00 0.40	Very limited Depth to saturated zone Flooding Slow water movement	1.00 1.00 1.00
Boquerón-----	30	Very limited Slow water movement Depth to saturated zone Flooding Runoff	1.00 1.00 1.00 0.40	Slow water movement Depth to saturated zone Flooding	1.00 1.00 1.00
Serrano-----	20	Very limited Depth to saturated zone Sodium content Flooding Droughty Salinity	1.00 1.00 1.00 0.99 0.78	Very limited Depth to saturated zone Sodium content Flooding Droughty Salinity	1.00 1.00 1.00 0.99 0.50

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Table 18a.--Agricultural Waste Management (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food- processing waste		Application of sewage sludge	
		Rating class and limiting features	Value	Rating class and limiting features	Value
MeA: Maní-----	80	Very limited Slow water movement Depth to saturated zone Flooding Runoff Too acid	1.00 0.99 0.60 0.40 0.03	Very limited Slow water movement Flooding Depth to saturated zone Too acid	1.00 1.00 0.99 0.14
MFF: Maresúa-----	80	Very limited Slope Droughty Depth to bedrock	1.00 0.95 0.80	Very limited Slope Droughty Depth to bedrock	1.00 0.95 0.80
MgF: Maresúa-----	40	Very limited Slope Droughty Depth to bedrock	1.00 0.95 0.80	Very limited Slope Droughty Depth to bedrock	1.00 0.95 0.80
Serpentine outcrop-----	40	Not rated		Not rated	
MiD: Mariana-----	95	Very limited Slow water movement Slope Too acid Runoff	1.00 1.00 0.94 0.40	Very limited Slow water movement Too acid Slope	1.00 1.00 1.00
MiE: Mariana-----	95	Very limited Slope Slow water movement Too acid Runoff	1.00 1.00 0.94 0.40	Very limited Slow water movement Slope Too acid	1.00 1.00 1.00
MkF: Maricao-----	80	Very limited Slope Slow water movement Too acid Runoff	1.00 1.00 0.89 0.40	Very limited Slow water movement Slope Too acid Low adsorption	1.00 1.00 1.00 0.02
MkG: Maricao-----	80	Very limited Slope Slow water movement Too acid Runoff	1.00 1.00 0.89 0.40	Very limited Slow water movement Slope Too acid Low adsorption	1.00 1.00 1.00 0.02

Soil Survey of San Germán Area, Puerto Rico

Table 18a.--Agricultural Waste Management (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food- processing waste		Application of sewage sludge	
		Rating class and limiting features	Value	Rating class and limiting features	Value
MnA: Melones-----	95	Very limited Slow water movement Sodium content Runoff Salinity	1.00 1.00 0.40 0.08	Very limited Slow water movement Sodium content	1.00 1.00
MnC: Melones-----	95	Very limited Slow water movement Sodium content Runoff Salinity Slope	1.00 1.00 0.40 0.08 0.04	Very limited Slow water movement Sodium content Slope	1.00 1.00 0.04
MoB: Montalva-----	80	Very limited Slow water movement Runoff Depth to bedrock Droughty	1.00 0.40 0.29 0.01	Very limited Slow water movement Depth to bedrock Droughty	1.00 0.29 0.01
MoC: Montalva-----	80	Very limited Slow water movement Runoff Depth to bedrock Slope Droughty	1.00 0.40 0.29 0.04 0.01	Very limited Slow water movement Depth to bedrock Slope Droughty	1.00 0.29 0.04 0.01
MqC: Montegrande-----	90	Very limited Slow water movement Depth to saturated zone Runoff	1.00 0.86 0.40	Very limited Slow water movement Depth to saturated zone	1.00 0.86
MrD: Morado-----	85	Very limited Slow water movement Slope Depth to bedrock Droughty Runoff	1.00 1.00 0.99 0.95 0.40	Very limited Slow water movement Slope Depth to bedrock Droughty	1.00 1.00 0.99 0.95
MrE: Morado-----	85	Very limited Slope Slow water movement Depth to bedrock Droughty Runoff	1.00 1.00 0.99 0.95 0.40	Very limited Slow water movement Slope Depth to bedrock Droughty	1.00 1.00 0.99 0.95

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Table 18a.--Agricultural Waste Management (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food- processing waste		Application of sewage sludge	
		Rating class and limiting features	Value	Rating class and limiting features	Value
MrF: Morado-----	85	Very limited Slope Slow water movement Depth to bedrock Droughty Runoff	1.00 1.00 0.99 0.95 0.40	Very limited Slow water movement Slope Depth to bedrock Droughty	1.00 1.00 0.99 0.95
MuC: Múcara-----	80	Very limited Slow water movement Droughty Runoff Depth to bedrock Slope	1.00 0.98 0.40 0.29 0.04	Very limited Slow water movement Droughty Depth to bedrock Slope	1.00 0.98 0.29 0.04
MuD: Múcara-----	80	Very limited Slow water movement Slope Droughty Runoff Depth to bedrock	1.00 1.00 0.98 0.40 0.29	Very limited Slow water movement Slope Droughty Depth to bedrock	1.00 1.00 0.98 0.29
MuE: Múcara-----	80	Very limited Slope Slow water movement Droughty Runoff Depth to bedrock	1.00 1.00 0.98 0.40 0.29	Very limited Slow water movement Slope Droughty Depth to bedrock	1.00 1.00 0.98 0.29
MuF: Múcara-----	80	Very limited Slope Slow water movement Droughty Runoff Depth to bedrock	1.00 1.00 0.98 0.40 0.29	Very limited Slow water movement Slope Droughty Depth to bedrock	1.00 1.00 0.98 0.29
NpD: Niye-----	95	Very limited Low adsorption Slope Too acid	1.00 0.84 0.50	Very limited Low adsorption Too acid Slope	1.00 0.99 0.84
OrA: Olivares-----	95	Very limited Slow water movement Ponding Filtering capacity Runoff Droughty	1.00 1.00 0.99 0.40 0.01	Very limited Slow water movement Ponding Filtering capacity Droughty	1.00 1.00 0.99 0.01

Soil Survey of San Germán Area, Puerto Rico

Table 18a.--Agricultural Waste Management (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food- processing waste		Application of sewage sludge	
		Rating class and limiting features	Value	Rating class and limiting features	Value
PaA: Palmarejo-----	90	Very limited Slow water movement Too acid Runoff	1.00 0.78 0.40	Very limited Slow water movement Too acid	1.00 1.00
PaB: Palmarejo-----	90	Very limited Slow water movement Too acid Runoff	1.00 0.78 0.40	Very limited Slow water movement Too acid	1.00 1.00
PaC: Palmarejo-----	90	Somewhat limited Too acid Runoff Slope	0.78 0.40 0.01	Very limited Too acid Slope	1.00 0.01
PgA: Parguera-----	80	Very limited Slow water movement Runoff	1.00 0.40	Very limited Slow water movement	1.00
PgB: Parguera-----	80	Very limited Slow water movement Runoff	1.00 0.40	Very limited Slow water movement	1.00
PsF: Pitahaya-----	60	Very limited Slope Slow water movement Droughty Depth to bedrock Runoff	1.00 1.00 1.00 1.00 0.40	Very limited Droughty Slow water movement Slope Depth to bedrock	1.00 1.00 1.00 1.00
Limestone outcrop---	20	Not rated		Not rated	
Seboruco-----	15	Very limited Slope Slow water movement Droughty Runoff	1.00 1.00 1.00 0.40	Very limited Slow water movement Slope Droughty	1.00 1.00 1.00
PsG: Pitahaya-----	60	Very limited Slope Slow water movement Droughty Depth to bedrock Runoff	1.00 1.00 1.00 1.00 0.40	Very limited Droughty Slow water movement Slope Depth to bedrock	1.00 1.00 1.00 1.00
Limestone outcrop---	20	Not rated		Not rated	

Soil Survey of San Germán Area, Puerto Rico

Table 18a.--Agricultural Waste Management (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food- processing waste		Application of sewage sludge	
		Rating class and limiting features	Value	Rating class and limiting features	Value
PsG: Seboruco-----	15	Very limited Slope Slow water movement Droughty Runoff	 1.00 1.00 1.00 0.40	Very limited Slow water movement Slope Droughty	 1.00 1.00 1.00
Pt: Pits and quarries---	100	Not rated		Not rated	
PzB: Pozo Blanco-----	95	Very limited Slow water movement Large stones on the surface Runoff	 1.00 1.00 0.40	Very limited Slow water movement Large stones on the surface	 1.00 1.00
PzC: Pozo Blanco-----	95	Very limited Slow water movement Large stones on the surface Runoff Slope	 1.00 1.00 0.40 0.04	Very limited Slow water movement Large stones on the surface Slope	 1.00 1.00 0.04
PzD: Pozo Blanco-----	95	Very limited Slow water movement Large stones on the surface Slope Runoff	 1.00 1.00 1.00 0.40	Very limited Slow water movement Large stones on the surface Slope	 1.00 1.00 1.00
QbD: Quebrada-----	95	Very limited Depth to bedrock Slope Droughty	 1.00 1.00 0.95	Very limited Depth to bedrock Slope Droughty	 1.00 1.00 0.95
QbE: Quebrada-----	95	Very limited Slope Depth to bedrock Droughty	 1.00 1.00 0.95	Very limited Depth to bedrock Slope Droughty	 1.00 1.00 0.95
QbF: Quebrada-----	95	Very limited Slope Depth to bedrock Droughty	 1.00 1.00 0.95	Very limited Depth to bedrock Slope Droughty	 1.00 1.00 0.95

Soil Survey of San Germán Area, Puerto Rico

Table 18a.--Agricultural Waste Management (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food- processing waste		Application of sewage sludge	
		Rating class and limiting features	Value	Rating class and limiting features	Value
ReA: Reilly-----	95	Very limited Filtering capacity Flooding Droughty Depth to saturated zone Leaching	1.00 1.00 1.00 0.86 0.45	Very limited Filtering capacity Flooding Droughty Depth to saturated zone	1.00 1.00 1.00 1.00 0.86
RoD: Rosario-----	80	Very limited Slope Slow water movement Depth to bedrock Droughty	1.00 1.00 1.00 0.29 0.06	Very limited Slope Slow water movement Depth to bedrock Droughty	1.00 1.00 0.99 0.29 0.06
RoE: Rosario-----	80	Very limited Slope Slow water movement Depth to bedrock Droughty	1.00 1.00 1.00 0.29 0.06	Very limited Slope Slow water movement Depth to bedrock Droughty	1.00 1.00 0.99 0.29 0.06
RoF: Rosario-----	80	Very limited Slope Slow water movement Depth to bedrock Droughty	1.00 1.00 1.00 0.29 0.06	Very limited Slope Slow water movement Depth to bedrock Droughty	1.00 1.00 0.99 0.29 0.06
RuF: Rubias-----	60	Very limited Slope Depth to bedrock Droughty Slow water movement	1.00 0.86 0.48 0.30	Very limited Slope Depth to bedrock Droughty Slow water movement	1.00 0.86 0.48 0.22
Chiquito-----	30	Very limited Slope Depth to bedrock Droughty Runoff	1.00 1.00 0.99 0.40	Very limited Depth to bedrock Slope Droughty	1.00 1.00 0.99
RuG: Rubias-----	60	Very limited Slope Depth to bedrock Droughty Slow water movement	1.00 0.86 0.48 0.30	Very limited Slope Depth to bedrock Droughty Slow water movement	1.00 0.86 0.48 0.22

Soil Survey of San Germán Area, Puerto Rico

Table 18a.--Agricultural Waste Management (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food- processing waste		Application of sewage sludge	
		Rating class and limiting features	Value	Rating class and limiting features	Value
RuG: Chiquito-----	30	Very limited Slope Depth to bedrock Droughty Runoff	1.00 1.00 0.99 0.40	Very limited Depth to bedrock Slope Droughty	1.00 1.00 0.99
Sa: Salt flats, ponded---	100	Not rated		Not rated	
Sb: Salt pits-----	100	Not rated		Not rated	
ScA: San Antón-----	95	Somewhat limited Flooding	0.60	Very limited Flooding	1.00
SdD: San Germán-----	95	Very limited Slow water movement Droughty Depth to bedrock Slope Runoff	1.00 1.00 1.00 0.84 0.40	Very limited Droughty Slow water movement Depth to bedrock Slope	1.00 1.00 1.00 0.84
SdF: San Germán-----	95	Very limited Slope Slow water movement Droughty Depth to bedrock Runoff	1.00 1.00 1.00 1.00 0.40	Very limited Droughty Slow water movement Slope Depth to bedrock	1.00 1.00 1.00 1.00
SgD: San Germán-----	60	Very limited Slow water movement Droughty Depth to bedrock Slope Runoff	1.00 1.00 1.00 0.84 0.40	Very limited Droughty Slow water movement Depth to bedrock Slope	1.00 1.00 1.00 0.84
Duey-----	40	Very limited Droughty Depth to bedrock Slope Runoff	1.00 1.00 0.84 0.40	Very limited Droughty Depth to bedrock Slope	1.00 1.00 0.84
SgF: San Germán-----	60	Very limited Slope Slow water movement Droughty Depth to bedrock Runoff	1.00 1.00 1.00 1.00 0.40	Very limited Droughty Slow water movement Slope Depth to bedrock	1.00 1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18a.--Agricultural Waste Management (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food- processing waste		Application of sewage sludge	
		Rating class and limiting features	Value	Rating class and limiting features	Value
SgF: Duey-----	40	Very limited Slope Droughty Depth to bedrock Runoff	 1.00 1.00 1.00 0.40	Very limited Droughty Slope Depth to bedrock	 1.00 1.00 1.00
SiA: Santa Isabel-----	95	Very limited Slow water movement Runoff	 1.00 0.40	Very limited Slow water movement	 1.00
SmE: Santa Marta-----	95	Very limited Slope Depth to bedrock	 1.00 0.03	Very limited Slope Depth to bedrock	 1.00 0.03
SoC: Seboruco-----	90	Very limited Slow water movement Droughty Runoff	 1.00 1.00 0.40	Very limited Slow water movement Droughty	 1.00 1.00
SsB: Sosa-----	90	Very limited Slow water movement Dense layer Runoff Too acid Droughty	 1.00 1.00 0.40 0.14 0.12	Very limited Slow water movement Too acid Droughty	 1.00 0.55 0.12
SsC: Sosa-----	90	Very limited Slow water movement Dense layer Runoff Too acid Droughty	 1.00 1.00 0.40 0.14 0.12	Very limited Slow water movement Too acid Droughty Slope	 1.00 0.55 0.12 0.01
TeA: Teresa-----	95	Very limited Slow water movement Sodium content Runoff Salinity	 1.00 0.92 0.40 0.06	Very limited Slow water movement Sodium content	 1.00 0.92
TfA: Teresa, ponded-----	95	Very limited Slow water movement Ponding Sodium content Runoff Salinity	 1.00 1.00 0.92 0.40 0.06	Very limited Slow water movement Ponding Sodium content	 1.00 1.00 0.92

Soil Survey of San Germán Area, Puerto Rico

Table 18a.--Agricultural Waste Management (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food- processing waste		Application of sewage sludge	
		Rating class and limiting features	Value	Rating class and limiting features	Value
ToA: Toa-----	90	Somewhat limited Flooding	0.60	Very limited Flooding	1.00
Ua: Urban land-----	100	Not rated		Not rated	
Ubb: Urban land-----	85	Not rated		Not rated	
Bahía-----	10	Very limited Filtering capacity	0.99	Very limited Filtering capacity	0.99
		Leaching	0.45	Too acid	0.96
		Too acid	0.37		
UgB: Urban land-----	85	Not rated		Not rated	
Guayabo-----	10	Very limited Filtering capacity	1.00	Very limited Filtering capacity	1.00
		Leaching	0.45	Droughty	0.10
		Droughty	0.10		
UsC: Urban land-----	80	Not rated		Not rated	
Sosa-----	15	Very limited Slow water movement	1.00	Very limited Slow water movement	1.00
		Dense layer	1.00	Too acid	0.55
		Runoff	0.40	Droughty	0.12
		Too acid	0.14	Slope	0.01
		Droughty	0.12		
VaA: Vayas-----	90	Very limited Slow water movement	1.00	Very limited Slow water movement	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Flooding	0.60	Flooding	1.00
		Runoff	0.40	Sodium content	0.08
		Sodium content	0.08		
VoC: Voladora-----	90	Very limited Slow water movement	1.00	Very limited Slow water movement	1.00
		Runoff	0.40	Too acid	0.77
		Too acid	0.22	Slope	0.04
		Slope	0.04		

Soil Survey of San Germán Area, Puerto Rico

Table 18a.--Agricultural Waste Management (Part 1)--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food- processing waste		Application of sewage sludge	
		Rating class and limiting features	Value	Rating class and limiting features	Value
VoD: Voladora-----	90	Very limited Slow water movement Slope Runoff Too acid	1.00 1.00 0.40 0.22	Very limited Slow water movement Slope Too acid	1.00 1.00 0.77
W: Water-----	100	Not rated		Not rated	

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)

[The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table]

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
AbF: Agüeybaná-----	85	Very limited Slow water movement Too steep for surface application Too steep for sprinkler application Too acid Low adsorption	1.00 1.00 1.00 1.00 1.00 0.66	Very limited Too steep for surface application Too acid Seepage Low adsorption	1.00 1.00 1.00 1.00 0.66
AgD: Aguilita-----	90	Very limited Too steep for surface application Too steep for sprinkler application Sodium content	1.00 0.90 0.02	Very limited Seepage Too steep for surface application Depth to bedrock Sodium content	1.00 1.00 0.14 0.02
AgF: Aguilita-----	80	Very limited Too steep for surface application Too steep for sprinkler application Sodium content	1.00 1.00 0.02	Very limited Too steep for surface application Seepage Depth to bedrock Sodium content	1.00 1.00 0.14 0.02
AkA: Aguirre-----	95	Very limited Slow water movement Ponding	1.00 1.00	Very limited Ponding Too level	1.00 1.00
AlF: Aljibe-----	40	Very limited Too steep for surface application Too steep for sprinkler application Filtering capacity Too acid Droughty	1.00 1.00 0.99 0.77 0.36	Very limited Seepage Too steep for surface application Depth to bedrock Too acid	1.00 1.00 1.00 0.77

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
AlF:					
Guamá-----	30	Very limited		Very limited	
		Too steep for	1.00	Seepage	1.00
		surface		Too steep for	1.00
		application		surface	
		Too steep for	1.00	application	
		sprinkler		Too acid	0.99
		application			
		Filtering	0.99		
		capacity			
		Too acid	0.99		
Indiera-----	25	Very limited		Very limited	
		Too steep for	1.00	Seepage	1.00
		surface		Too steep for	1.00
		application		surface	
		Too steep for	1.00	application	
		sprinkler		Too acid	1.00
		application		Depth to bedrock	0.71
		Too acid	1.00		
		Filtering	0.99		
		capacity			
AtD:					
Altamira-----	85	Very limited		Somewhat limited	
		Slow water	1.00	Too steep for	0.22
		movement		surface	
		Too steep for	1.00	application	
		surface		Depth to bedrock	0.14
		application		Sodium content	0.02
		Too steep for	0.10		
		sprinkler			
		application			
		Sodium content	0.02		
AtF:					
Altamira-----	85	Very limited		Very limited	
		Slow water	1.00	Too steep for	1.00
		movement		surface	
		Too steep for	1.00	application	
		surface		Depth to bedrock	0.14
		application		Sodium content	0.02
		Too steep for	1.00		
		sprinkler			
		application			
		Sodium content	0.02		
BaB:					
Bahía-----	90	Very limited		Very limited	
		Filtering	0.99	Seepage	1.00
		capacity		Too acid	0.96
		Too acid	0.96		
BhB:					
Bahía Salinas-----	90	Very limited		Very limited	
		Droughty	1.00	Seepage	1.00
		Filtering	1.00	Salinity	0.50
		capacity		Sodium content	0.08
		Salinity	1.00		
		Sodium content	0.08		

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
BjA: Bajura-----	90	Very limited Slow water movement Depth to saturated zone Flooding	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00
BkB: Beaches-----	100	Not rated		Not rated	
BmC: Bermeja-----	70	Very limited Droughty Cobble content Depth to bedrock Too steep for surface application Too acid	1.00 1.00 1.00 1.00 0.55	Very limited Depth to bedrock Seepage Too acid Too steep for surface application	1.00 1.00 0.55 0.22
Cerro Mariquita-----	20	Very limited Droughty Depth to bedrock Too steep for surface application Too steep for sprinkler application	1.00 1.00 1.00 0.10	Very limited Depth to bedrock Seepage Too steep for surface application	1.00 1.00 0.22
BmD: Bermeja-----	70	Very limited Droughty Cobble content Too steep for surface application Depth to bedrock Too steep for sprinkler application	1.00 1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Seepage Too acid	1.00 1.00 1.00 0.55
Cerro Mariquita-----	20	Very limited Droughty Depth to bedrock Too steep for surface application Too steep for sprinkler application	1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Seepage	1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
BmF: Bermeja-----	75	Very limited Droughty Cobble content Too steep for surface application Too steep for sprinkler application Depth to bedrock	1.00 1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Seepage Too acid	1.00 1.00 1.00 0.55
Cerro Mariquita-----	20	Very limited Droughty Depth to bedrock Too steep for surface application Too steep for sprinkler application	1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Seepage	1.00 1.00 1.00
BrF: Bermeja-----	75	Very limited Droughty Cobble content Too steep for surface application Too steep for sprinkler application Depth to bedrock	1.00 1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Seepage Too acid	1.00 1.00 1.00 0.55
Rock outcrop-----	15	Not rated		Not rated	
CaC: Cabo Rojo-----	90	Very limited Slow water movement Too steep for surface application Too acid Too steep for sprinkler application	1.00 0.92 0.77 0.02	Somewhat limited Too acid Seepage Too steep for surface application	0.77 0.62 0.06
CbD: Caguabo-----	85	Very limited Droughty Too steep for surface application Depth to bedrock Too steep for sprinkler application	1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Seepage	1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
CbF: Caguabo-----	85	Very limited Droughty Too steep for surface application Too steep for sprinkler application Depth to bedrock	1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Seepage	1.00 1.00 1.00
CeA: Cartagena-----	85	Very limited Slow water movement Sodium content Ponding Salinity	1.00 1.00 1.00 0.50	Very limited Sodium content Ponding	1.00 1.00
CgD: Casabe-----	90	Very limited Droughty Slow water movement Depth to bedrock Too steep for surface application Too steep for sprinkler application	1.00 1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application	1.00 1.00
CgF: Casabe-----	90	Very limited Droughty Slow water movement Depth to bedrock Too steep for surface application Too steep for sprinkler application	1.00 1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application	1.00 1.00
ChA: Cataño-----	95	Somewhat limited Droughty	0.14	Very limited Seepage	1.00
CjD: Cerro Gordo-----	90	Very limited Too acid Too steep for surface application Filtering capacity Too steep for sprinkler application	1.00 1.00 0.99 0.78	Very limited Seepage Too acid Too steep for surface application	1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
CkD: Cerro Mariquita-----	80	Very limited Droughty Depth to bedrock Too steep for surface application Too steep for sprinkler application	1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Seepage	1.00 1.00 1.00
CkF: Cerro Mariquita-----	80	Very limited Droughty Depth to bedrock Too steep for surface application Too steep for sprinkler application	1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Seepage	1.00 1.00 1.00
CmB: Coamo-----	90	Very limited Too steep for surface application Slow water movement Too steep for sprinkler application	1.00 0.37 0.22	Somewhat limited Seepage Too steep for surface application	0.62 0.50
CoA: Coloso-----	90	Very limited Slow water movement Depth to saturated zone Flooding	1.00 0.99 0.60	Very limited Flooding Depth to saturated zone	1.00 0.99
CsE: Consumo-----	80	Very limited Slow water movement Too steep for surface application Too steep for sprinkler application Too acid	1.00 1.00 1.00 1.00	Very limited Too steep for surface application Seepage Too acid	1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
CsF: Consumo-----	80	Very limited Slow water movement Too steep for surface application Too steep for sprinkler application Too acid	1.00 1.00 1.00 1.00	Very limited Too steep for surface application Seepage Too acid	1.00 1.00 1.00
CtA: Cortada-----	98	Somewhat limited Flooding Sodium content	0.60 0.08	Very limited Flooding Seepage Sodium content	1.00 1.00 0.08
CuD: Costa-----	67	Very limited Droughty Slow water movement Depth to bedrock Too steep for surface application Too steep for sprinkler application	1.00 1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application	1.00 1.00
Pitahaya-----	25	Very limited Droughty Slow water movement Depth to bedrock Too steep for surface application	1.00 1.00 1.00 0.32	Very limited Depth to bedrock	1.00
CuF: Costa-----	67	Very limited Droughty Slow water movement Too steep for surface application Too steep for sprinkler application Depth to bedrock	1.00 1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application	1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
CuF: Pitahaya-----	25	Very limited Droughty Slow water movement Too steep for surface application Too steep for sprinkler application Depth to bedrock	1.00 1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application	1.00 1.00
CvF: Cuchillas-----	80	Very limited Too steep for surface application Too steep for sprinkler application Droughty Depth to bedrock	1.00 1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Seepage	1.00 1.00 1.00
CvG: Cuchillas-----	80	Very limited Too steep for surface application Too steep for sprinkler application Droughty Depth to bedrock	1.00 1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Seepage	1.00 1.00 1.00
DeD: Delicias-----	95	Very limited Too acid Too steep for surface application Too steep for sprinkler application Low adsorption	1.00 1.00 0.90 0.58	Very limited Too acid Seepage Too steep for surface application Low adsorption	1.00 1.00 1.00 0.58
DqA: Dique-----	90	Very limited Flooding	1.00	Very limited Flooding Seepage	1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
DsC: Descalabrado-----	90	Very limited Droughty Slow water movement Depth to bedrock Too steep for surface application Too steep for sprinkler application	1.00 1.00 1.00 0.92 0.02	Very limited Depth to bedrock Too steep for surface application	1.00 0.06
DsD: Descalabrado-----	90	Very limited Droughty Slow water movement Depth to bedrock Too steep for surface application Too steep for sprinkler application	1.00 1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application	1.00 1.00
DsF: Descalabrado-----	90	Very limited Droughty Slow water movement Depth to bedrock Too steep for surface application Too steep for sprinkler application	1.00 1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application	1.00 1.00
Ecd: El Cacique-----	60	Very limited Droughty Slow water movement Depth to bedrock Too steep for surface application Too steep for sprinkler application	1.00 1.00 1.00 1.00 0.90	Very limited Depth to bedrock Seepage Too steep for surface application	1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
EcD: La Taína-----	30	Very limited Slow water movement Depth to bedrock Droughty Too steep for surface application Too steep for sprinkler application	1.00 1.00 1.00 1.00 0.90	Very limited Depth to bedrock Too steep for surface application	1.00 1.00
EcF: El Cacique-----	60	Very limited Droughty Slow water movement Depth to bedrock Too steep for surface application Too steep for sprinkler application	1.00 1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Seepage	1.00 1.00 1.00
La Taína-----	30	Very limited Slow water movement Too steep for surface application Too steep for sprinkler application Depth to bedrock Droughty	1.00 1.00 1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application	1.00 1.00
EcG: El Cacique-----	60	Very limited Droughty Slow water movement Depth to bedrock Too steep for surface application Too steep for sprinkler application	1.00 1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Seepage	1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
EcG: La Taína-----	30	Very limited Slow water movement Too steep for surface application Too steep for sprinkler application Depth to bedrock Droughty	1.00 1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application	1.00 1.00
EdD: El Descanso-----	50	Very limited Depth to bedrock Droughty Too steep for surface application Filtering capacity Too steep for sprinkler application	1.00 1.00 1.00 0.99 0.90	Very limited Seepage Depth to bedrock Too steep for surface application	1.00 1.00 1.00
Hoconuco-----	45	Very limited Droughty Slow water movement Depth to bedrock Too steep for surface application Filtering capacity	1.00 1.00 1.00 1.00 0.99	Very limited Seepage Depth to bedrock Too steep for surface application Too acid	1.00 1.00 1.00 0.85
EdF: El Descanso-----	50	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler application Droughty Filtering capacity	1.00 1.00 1.00 1.00 0.99	Very limited Seepage Depth to bedrock Too steep for surface application	1.00 1.00 1.00
Hoconuco-----	45	Very limited Droughty Slow water movement Too steep for surface application Too steep for sprinkler application Depth to bedrock	1.00 1.00 1.00 1.00 1.00	Very limited Seepage Depth to bedrock Too steep for surface application Too acid	1.00 1.00 1.00 0.85

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
EdG: El Descanso-----	50	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler application Droughty Filtering capacity	1.00 1.00 1.00 1.00 0.99	Very limited Seepage Depth to bedrock Too steep for surface application	1.00 1.00 1.00
Hoconuco-----	45	Very limited Droughty Slow water movement Too steep for surface application Too steep for sprinkler application Depth to bedrock	1.00 1.00 1.00 1.00 1.00	Very limited Seepage Depth to bedrock Too steep for surface application Too acid	1.00 1.00 1.00 0.85
EpC: El Papayo-----	95	Very limited Droughty Slow water movement Depth to bedrock Too steep for surface application Too steep for sprinkler application	1.00 1.00 1.00 0.92 0.02	Very limited Depth to bedrock Seepage Too steep for surface application	1.00 1.00 0.06
EpD: El Papayo-----	95	Very limited Droughty Slow water movement Depth to bedrock Too steep for surface application Too steep for sprinkler application	1.00 1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Seepage	1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
EpF: El Papayo-----	95	Very limited Droughty Slow water movement Depth to bedrock Too steep for surface application Too steep for sprinkler application	1.00 1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Seepage	1.00 1.00 1.00
FeA: Fé-----	95	Very limited Slow water movement Sodium content Salinity	1.00 1.00 0.50	Very limited Sodium content	1.00
FrA: Fraternidad-----	90	Very limited Slow water movement	1.00	Not limited	
FrB: Fraternidad-----	90	Very limited Slow water movement	1.00	Not limited	
GbF: Guanábano-----	95	Very limited Slow water movement Too steep for surface application Too steep for sprinkler application Too acid	1.00 1.00 1.00 1.00 0.07	Very limited Too steep for surface application Seepage Too acid	1.00 1.00 0.07
GhC: Guanajibo-----	90	Very limited Droughty Slow water movement Too acid Too steep for surface application Low adsorption	1.00 1.00 0.99 0.92 0.60	Very limited Seepage Too acid Low adsorption Too steep for surface application	1.00 0.99 0.60 0.06
GnA: Guánica-----	80	Very limited Slow water movement Ponding Sodium content	1.00 1.00 1.00	Very limited Sodium content Ponding	1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
GuB: Guayabo-----	90	Very limited Filtering capacity Droughty	1.00 0.10	Very limited Seepage	1.00
GyB: Guayacán-----	90	Very limited Slow water movement	1.00	Not limited	
GyC: Guayacán-----	90	Very limited Slow water movement Too steep for surface application Too steep for sprinkler application	1.00 1.00 0.22	Somewhat limited Too steep for surface application	0.50
GyD: Guayacán-----	90	Very limited Slow water movement Too steep for surface application Too steep for sprinkler application	1.00 1.00 1.00	Very limited Too steep for surface application	1.00
HmD: Humatas-----	80	Very limited Slow water movement Too steep for surface application Too steep for sprinkler application Too acid	1.00 1.00 1.00 0.77	Very limited Too steep for surface application Too acid	1.00 0.77
HmE: Humatas-----	80	Very limited Slow water movement Too steep for surface application Too steep for sprinkler application Too acid	1.00 1.00 1.00 0.77	Very limited Too steep for surface application Too acid	1.00 0.77

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
HmF: Humatas-----	80	Very limited Slow water movement Too steep for surface application Too steep for sprinkler application Too acid	1.00 1.00 1.00 0.77	Very limited Too steep for surface application Too acid	1.00 0.77
JaB: Jácana-----	80	Very limited Slow water movement Depth to bedrock Too steep for surface application Droughty	1.00 0.20 0.08 0.01	Very limited Depth to bedrock Seepage	1.00 0.62
JaC: Jácana-----	80	Very limited Slow water movement Too steep for surface application Too steep for sprinkler application Depth to bedrock Droughty	1.00 1.00 0.22 0.20 0.01	Very limited Depth to bedrock Seepage Too steep for surface application	1.00 0.62 0.50
JBA: Joyuda-----	50	Very limited Depth to saturated zone Flooding Filtering capacity	1.00 1.00 0.99	Very limited Flooding Seepage Depth to saturated zone	1.00 1.00 1.00
Atolladero-----	30	Very limited Depth to saturated zone Flooding Filtering capacity Droughty Salinity	1.00 1.00 0.99 0.50 0.50	Very limited Flooding Seepage Depth to saturated zone	1.00 1.00 1.00
Bajura-----	20	Very limited Slow water movement Depth to saturated zone Flooding	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
LcE: La Covana-----	60	Very limited Droughty Slow water movement Depth to cemented pan Too steep for surface application Too steep for sprinkler application	1.00 1.00 1.00 1.00 1.00	Very limited Depth to cemented pan Too steep for surface application	1.00 1.00
Limestone outcrop---	20	Not rated		Not rated	
Seboruco-----	15	Very limited Slow water movement Too steep for surface application Droughty Too steep for sprinkler application	1.00 1.00 1.00 1.00	Very limited Too steep for surface application Seepage	1.00 1.00
LdA: La Luna-----	90	Very limited Slow water movement Flooding Sodium content	1.00 0.60 0.08	Very limited Flooding Seepage Sodium content	1.00 0.62 0.08
LeF: La Tea-----	70	Very limited Droughty Slow water movement Depth to bedrock Too steep for surface application Too steep for sprinkler application	1.00 1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application	1.00 1.00
LfC: Landfill-----	100	Not rated		Not rated	
LkB: Lares-----	80	Very limited Slow water movement Too acid	1.00 1.00	Very limited Too acid Seepage	1.00 1.00
LnA: Llanos Costa-----	75	Very limited Slow water movement Too acid	1.00 0.67	Very limited Seepage Too acid	1.00 0.67

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
LnB: Llanos Costa-----	75	Very limited Slow water movement Too acid	1.00 0.67	Very limited Seepage Too acid	1.00 0.67
LnC: Llanos Costa-----	75	Very limited Slow water movement Too steep for surface application Too acid Too steep for sprinkler application	1.00 0.92 0.67 0.02	Very limited Seepage Too acid Too steep for surface application	1.00 0.67 0.06
LpG: Los Peñones-----	60	Very limited Droughty Depth to bedrock Too steep for surface application Too steep for sprinkler application Filtering capacity	1.00 1.00 1.00 1.00 0.99	Very limited Seepage Depth to bedrock Too steep for surface application	1.00 1.00 1.00
Limestone outcrop---	40	Not rated		Not rated	
MaB: Mabí-----	70	Very limited Slow water movement Depth to saturated zone Too acid	1.00 1.00 0.99	Very limited Depth to saturated zone Too acid Flooding	1.00 0.99 0.40
MbA: Maguayo-----	80	Very limited Slow water movement Too acid	1.00 0.42	Very limited Seepage Too acid	1.00 0.42
MbC: Maguayo-----	80	Very limited Slow water movement Too steep for surface application Too acid Too steep for sprinkler application	1.00 1.00 0.42 0.10	Very limited Seepage Too acid Too steep for surface application	1.00 0.42 0.22

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
McF: Malaya-----	90	Very limited Droughty Slow water movement Depth to bedrock Too steep for surface application Too steep for sprinkler application	1.00 1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too acid	1.00 1.00 0.07
MDA: Manglillo-----	50	Very limited Depth to saturated zone Flooding Slow water movement	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone Seepage	1.00 1.00 1.00
Boquerón-----	30	Very limited Slow water movement Depth to saturated zone Flooding	1.00 1.00 1.00	Very limited Flooding Depth to saturated zone Seepage	1.00 1.00 1.00
Serrano-----	20	Very limited Depth to saturated zone Flooding Sodium content Droughty Salinity	1.00 1.00 1.00 0.99 0.50	Very limited Sodium content Flooding Seepage Depth to saturated zone	1.00 1.00 1.00 1.00
MeA: Maní-----	80	Very limited Slow water movement Depth to saturated zone Flooding Too acid	1.00 0.99 0.60 0.14	Very limited Flooding Depth to saturated zone Too acid	1.00 0.99 0.14
MFF: Maresúa-----	80	Very limited Too steep for surface application Too steep for sprinkler application Droughty Depth to bedrock	1.00 1.00 0.95 0.80	Very limited Too steep for surface application Depth to bedrock Seepage	1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
MgF: Maresúa-----	40	Very limited Too steep for surface application Too steep for sprinkler application Droughty Depth to bedrock	1.00 1.00 0.95 0.80	Very limited Too steep for surface application Depth to bedrock Seepage	1.00 1.00 1.00
Serpentinite outcrop-----	40	Not rated		Not rated	
MiD: Mariana-----	95	Very limited Slow water movement Too steep for surface application Too acid Too steep for sprinkler application	1.00 1.00 1.00 1.00	Very limited Too steep for surface application Too acid Seepage	1.00 1.00 1.00
MiE: Mariana-----	95	Very limited Slow water movement Too steep for surface application Too steep for sprinkler application Too acid	1.00 1.00 1.00 1.00	Very limited Too steep for surface application Too acid Seepage	1.00 1.00 1.00
MkF: Maricao-----	80	Very limited Slow water movement Too steep for surface application Too steep for sprinkler application Too acid	1.00 1.00 1.00 1.00	Very limited Too steep for surface application Too acid	1.00 1.00
MkG: Maricao-----	80	Very limited Slow water movement Too steep for surface application Too steep for sprinkler application Too acid	1.00 1.00 1.00 1.00	Very limited Too steep for surface application Too acid	1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
MnA: Melones-----	95	Very limited Slow water movement Sodium content	1.00 1.00	Very limited Sodium content	1.00
MnC: Melones-----	95	Very limited Slow water movement Sodium content Too steep for surface application Too steep for sprinkler application	1.00 1.00 1.00 0.22	Very limited Sodium content Too steep for surface application	1.00 0.50
MoB: Montalva-----	80	Very limited Slow water movement Depth to bedrock Droughty	1.00 0.29 0.01	Very limited Depth to bedrock	1.00
MoC: Montalva-----	80	Very limited Slow water movement Too steep for surface application Depth to bedrock Too steep for sprinkler application Droughty	1.00 1.00 0.29 0.22 0.01	Very limited Depth to bedrock Too steep for surface application	1.00 0.50
MqC: Monte grande-----	90	Very limited Slow water movement Too steep for surface application Depth to saturated zone Too steep for sprinkler application	1.00 0.92 0.86 0.02	Somewhat limited Depth to saturated zone Too steep for surface application	0.86 0.06

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
MrD: Morado-----	85	Very limited Slow water movement Too steep for surface application Too steep for sprinkler application Depth to bedrock Droughty	1.00 1.00 1.00 0.99 0.95	Very limited Too steep for surface application Depth to bedrock	1.00 1.00
MrE: Morado-----	85	Very limited Slow water movement Too steep for surface application Too steep for sprinkler application Depth to bedrock Droughty	1.00 1.00 1.00 0.99 0.95	Very limited Too steep for surface application Depth to bedrock	1.00 1.00
MrF: Morado-----	85	Very limited Slow water movement Too steep for surface application Too steep for sprinkler application Depth to bedrock Droughty	1.00 1.00 1.00 0.99 0.95	Very limited Too steep for surface application Depth to bedrock	1.00 1.00
MuC: Múcara-----	80	Very limited Slow water movement Too steep for surface application Droughty Depth to bedrock Too steep for sprinkler application	1.00 1.00 0.98 0.29 0.22	Very limited Depth to bedrock Too steep for surface application	1.00 0.50

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
MuD: Múcara-----	80	Very limited Slow water movement Too steep for surface application Too steep for sprinkler application Droughty Depth to bedrock	1.00 1.00 1.00 0.98 0.29	Very limited Too steep for surface application Depth to bedrock	1.00 1.00
MuE: Múcara-----	80	Very limited Slow water movement Too steep for surface application Too steep for sprinkler application Droughty Depth to bedrock	1.00 1.00 1.00 0.98 0.29	Very limited Too steep for surface application Depth to bedrock	1.00 1.00
MuF: Múcara-----	80	Very limited Slow water movement Too steep for surface application Too steep for sprinkler application Droughty Depth to bedrock	1.00 1.00 1.00 0.98 0.29	Very limited Too steep for surface application Depth to bedrock	1.00 1.00
NpD: Niipe-----	95	Very limited Low adsorption Too steep for surface application Too acid Too steep for sprinkler application	1.00 1.00 0.99 0.90	Very limited Low adsorption Seepage Too steep for surface application Too acid	1.00 1.00 1.00 0.99
OrA: Olivares-----	95	Very limited Slow water movement Ponding Filtering capacity Droughty	1.00 1.00 0.99 0.01	Very limited Seepage Ponding	1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
PaA: Palmarejo-----	90	Very limited Slow water movement Too acid	1.00 1.00	Very limited Too acid Seepage	1.00 1.00
PaB: Palmarejo-----	90	Very limited Slow water movement Too acid	1.00 1.00	Very limited Too acid Seepage	1.00 1.00
PaC: Palmarejo-----	90	Very limited Too acid Too steep for surface application Too steep for sprinkler application	1.00 1.00 0.10	Very limited Too acid Seepage Too steep for surface application	1.00 1.00 0.22
PgA: Parguera-----	80	Very limited Slow water movement	1.00	Not limited	
PgB: Parguera-----	80	Very limited Slow water movement Too steep for surface application	1.00 0.08	Not limited	
PsF: Pitahaya-----	60	Very limited Droughty Slow water movement Too steep for surface application Too steep for sprinkler application Depth to bedrock	1.00 1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application	1.00 1.00
Limestone outcrop---	20	Not rated		Not rated	
Seboruco-----	15	Very limited Slow water movement Too steep for surface application Too steep for sprinkler application Droughty	1.00 1.00 1.00 1.00	Very limited Too steep for surface application Seepage	1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
PsG: Pitahaya-----	60	Very limited Droughty Slow water movement Too steep for surface application Too steep for sprinkler application Depth to bedrock	1.00 1.00 1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application	1.00 1.00
Limestone outcrop---	20	Not rated		Not rated	
Seboruco-----	15	Very limited Slow water movement Too steep for surface application Too steep for sprinkler application Droughty	1.00 1.00 1.00 1.00	Very limited Too steep for surface application Seepage	1.00 1.00
Pt: Pits and quarries---	100	Not rated		Not rated	
PzB: Pozo Blanco-----	95	Very limited Slow water movement Large stones on the surface	1.00 1.00	Very limited Stone content	1.00
PzC: Pozo Blanco-----	95	Very limited Slow water movement Large stones on the surface Too steep for surface application Too steep for sprinkler application	1.00 1.00 1.00 0.22	Very limited Stone content Too steep for surface application	1.00 0.50
PzD: Pozo Blanco-----	95	Very limited Slow water movement Large stones on the surface Too steep for surface application Too steep for sprinkler application	1.00 1.00 1.00 1.00	Very limited Too steep for surface application Stone content	1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
QbD: Quebrada-----	95	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler application Droughty	1.00 1.00 1.00 0.95	Very limited Depth to bedrock Too steep for surface application Seepage	1.00 1.00 1.00
QbE: Quebrada-----	95	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler application Droughty	1.00 1.00 1.00 0.95	Very limited Depth to bedrock Too steep for surface application Seepage	1.00 1.00 1.00
QbF: Quebrada-----	95	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler application Droughty	1.00 1.00 1.00 0.95	Very limited Depth to bedrock Too steep for surface application Seepage	1.00 1.00 1.00
ReA: Reilly-----	95	Very limited Filtering capacity Flooding Droughty Depth to saturated zone	1.00 1.00 1.00 0.86	Very limited Flooding Seepage Depth to saturated zone	1.00 1.00 0.86
RoD: Rosario-----	80	Very limited Too steep for surface application Too steep for sprinkler application Slow water movement Depth to bedrock Droughty	1.00 1.00 0.99 0.29 0.06	Very limited Too steep for surface application Depth to bedrock Seepage	1.00 1.00 0.01

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
RoE: Rosario-----	80	Very limited Too steep for surface application Too steep for sprinkler application Slow water movement Depth to bedrock Droughty	1.00 1.00 0.99 0.29 0.06	Very limited Too steep for surface application Depth to bedrock Seepage	1.00 1.00 0.01
RoF: Rosario-----	80	Very limited Too steep for surface application Too steep for sprinkler application Slow water movement Depth to bedrock Droughty	1.00 1.00 0.99 0.29 0.06	Very limited Too steep for surface application Depth to bedrock Seepage	1.00 1.00 0.01
RuF: Rubias-----	60	Very limited Too steep for surface application Too steep for sprinkler application Depth to bedrock Droughty Slow water movement	1.00 1.00 0.86 0.48 0.22	Very limited Depth to bedrock Too steep for surface application Seepage	1.00 1.00 1.00
Chiquito-----	30	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler application Droughty	1.00 1.00 1.00 0.99	Very limited Depth to bedrock Too steep for surface application Seepage	1.00 1.00 1.00
RuG: Rubias-----	60	Very limited Too steep for surface application Too steep for sprinkler application Depth to bedrock Droughty Slow water movement	1.00 1.00 0.86 0.48 0.22	Very limited Depth to bedrock Too steep for surface application Seepage	1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
RuG: Chiquito-----	30	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler application Droughty	1.00 1.00 1.00 0.99	Very limited Depth to bedrock Too steep for surface application Seepage	1.00 1.00 1.00
Sa: Salt flats, ponded---	100	Not rated		Not rated	
Sb: Salt pits-----	100	Not rated		Not rated	
SCA: San Antón-----	95	Somewhat limited Flooding	0.60	Very limited Flooding Seepage	1.00 1.00
SdD: San Germán-----	95	Very limited Droughty Slow water movement Too steep for surface application Depth to bedrock Too steep for sprinkler application	1.00 1.00 1.00 1.00 0.90	Very limited Depth to bedrock Too steep for surface application	1.00 1.00
SdF: San Germán-----	95	Very limited Droughty Slow water movement Too steep for surface application Too steep for sprinkler application Depth to bedrock	1.00 1.00 1.00 1.00 1.00	Very limited Too steep for surface application Depth to bedrock	1.00 1.00
SgD: San Germán-----	60	Very limited Droughty Slow water movement Too steep for surface application Depth to bedrock Too steep for sprinkler application	1.00 1.00 1.00 1.00 0.90	Very limited Depth to bedrock Too steep for surface application	1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
SgD: Duey-----	40	Very limited Droughty Depth to bedrock Too steep for surface application Too steep for sprinkler application	1.00 1.00 1.00 0.90	Very limited Seepage Depth to bedrock Too steep for surface application	1.00 1.00 1.00
SgF: San Germán-----	60	Very limited Droughty Slow water movement Too steep for surface application Too steep for sprinkler application Depth to bedrock	1.00 1.00 1.00 1.00 1.00	Very limited Too steep for surface application Depth to bedrock	1.00 1.00
Duey-----	40	Very limited Droughty Too steep for surface application Too steep for sprinkler application Depth to bedrock	1.00 1.00 1.00 1.00	Very limited Seepage Depth to bedrock Too steep for surface application	1.00 1.00 1.00
SiA: Santa Isabel-----	95	Very limited Slow water movement	1.00	Not limited	
SmE: Santa Marta-----	95	Very limited Too steep for surface application Too steep for sprinkler application Depth to bedrock	1.00 1.00 0.03	Very limited Too steep for surface application Seepage Depth to bedrock	1.00 1.00 1.00
SoC: Seboruco-----	90	Very limited Slow water movement Droughty Too steep for surface application Too steep for sprinkler application	1.00 1.00 0.92 0.02	Very limited Seepage Too steep for surface application	1.00 0.06

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Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
SsB: Sosa-----	90	Very limited Slow water movement Too acid Droughty Too steep for surface application	1.00 0.55 0.12 0.08	Very limited Seepage Too acid	1.00 0.55
SsC: Sosa-----	90	Very limited Slow water movement Too steep for surface application Too acid Droughty Too steep for sprinkler application	1.00 1.00 0.55 0.12 0.10	Very limited Seepage Too acid Too steep for surface application	1.00 0.55 0.22
TeA: Teresa-----	95	Very limited Slow water movement Sodium content	1.00 0.92	Somewhat limited Sodium content	0.92
TfA: Teresa, ponded-----	95	Very limited Slow water movement Ponding Sodium content	1.00 1.00 0.92	Very limited Ponding Sodium content	1.00 0.92
ToA: Toa-----	90	Somewhat limited Flooding	0.60	Very limited Flooding Seepage	1.00 1.00
Ua: Urban land-----	100	Not rated		Not rated	
UbB: Urban land-----	85	Not rated		Not rated	
Bahía-----	10	Very limited Filtering capacity Too acid	0.99 0.96	Very limited Seepage Too acid	1.00 0.96
UgB: Urban land-----	85	Not rated		Not rated	
Guayabo-----	10	Very limited Filtering capacity Droughty	1.00 0.10	Very limited Seepage	1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18b.--Agricultural Waste Management (Part 2)--Continued

Map symbol and soil name	Pct. of map unit	Disposal of wastewater by irrigation		Overland flow of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
UsC: Urban land-----	80	Not rated		Not rated	
Sosa-----	15	Very limited Slow water movement Too steep for surface application Too acid Droughty Too steep for sprinkler application	1.00 1.00 0.55 0.12 0.10	Very limited Seepage Too acid Too steep for surface application	1.00 0.55 0.22
VaA: Vayas-----	90	Very limited Slow water movement Depth to saturated zone Flooding Sodium content	1.00 1.00 0.60 0.08	Very limited Flooding Depth to saturated zone Sodium content	1.00 1.00 0.08
VoC: Voladora-----	90	Very limited Slow water movement Too steep for surface application Too acid Too steep for sprinkler application	1.00 1.00 0.77 0.22	Somewhat limited Too acid Too steep for surface application	0.77 0.50
VoD: Voladora-----	90	Very limited Slow water movement Too steep for surface application Too steep for sprinkler application Too acid	1.00 1.00 1.00 0.77	Very limited Too steep for surface application Too acid	1.00 0.77
W: Water-----	100	Not rated		Not rated	

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Table 18c.--Agricultural Waste Management (Part 3)

[The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table]

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
AbF: Agüeybaná-----	85	Very limited Slope Slow water movement Too acid	1.00 1.00 0.42	Very limited Too steep for surface application Too steep for sprinkler irrigation Too acid Slow water movement Low adsorption	1.00 1.00 1.00 1.00 0.99 0.66
AgD: Aguilita-----	90	Very limited Depth to bedrock Slow water movement Slope	1.00 1.00 1.00	Very limited Too steep for surface application Too steep for sprinkler irrigation Depth to bedrock Sodium content	1.00 1.00 1.00 0.14 0.02
AgF: Aguilita-----	80	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 1.00	Very limited Too steep for surface application Too steep for sprinkler irrigation Depth to bedrock Sodium content	1.00 1.00 1.00 0.14 0.02
AkA: Aguirre-----	95	Very limited Ponding Slow water movement	1.00 1.00	Very limited Slow water movement Ponding	1.00 1.00
AlF: Aljibe-----	40	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 1.00	Very limited Too steep for surface application Too steep for sprinkler irrigation Depth to bedrock Filtering capacity Too acid	1.00 1.00 1.00 1.00 0.99 0.77

Soil Survey of San Germán Area, Puerto Rico

Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
AlF: Guamá-----	30	Very limited Slope Slow water movement	1.00 1.00	Very limited Too steep for surface application Too steep for sprinkler irrigation Filtering capacity Too acid	1.00 1.00 0.99 0.99
Indiera-----	25	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 1.00	Very limited Too steep for surface application Too steep for sprinkler irrigation Too acid Filtering capacity Depth to bedrock	1.00 1.00 1.00 1.00 0.99 0.71
AtD: Altamira-----	85	Very limited Slow water movement Depth to bedrock Slope	1.00 1.00 1.00	Very limited Too steep for surface application Slow water movement Too steep for sprinkler irrigation Depth to bedrock Sodium content	1.00 0.99 0.22 0.14 0.02
AtF: Altamira-----	85	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Too steep for surface application Too steep for sprinkler irrigation Slow water movement Depth to bedrock Sodium content	1.00 1.00 0.99 0.14 0.02
BaB: Bahía-----	90	Somewhat limited Slow water movement	0.32	Very limited Filtering capacity Too acid	0.99 0.96

Soil Survey of San Germán Area, Puerto Rico

Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
BhB: Bahía Salinas-----	90	Not limited		Very limited Filtering capacity	1.00
				Salinity	1.00
				Sodium content	0.08
BjA: Bajura-----	90	Very limited Flooding	1.00	Very limited Slow water	1.00
		Slow water movement	1.00	movement	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
				Flooding	1.00
BkB: Beaches-----	100	Not rated		Not rated	
BmC: Bermeja-----	70	Very limited Depth to bedrock	1.00	Very limited Depth to bedrock	1.00
		Slow water movement	1.00	Cobble content	1.00
		Cobble content	1.00	Too steep for surface	1.00
		Slope	1.00	application	
				Too acid	0.55
				Too steep for sprinkler	0.22
				irrigation	
Cerro Mariquita-----	20	Very limited Depth to bedrock	1.00	Very limited Depth to bedrock	1.00
		Slow water movement	1.00	Too steep for surface	1.00
		Slope	1.00	application	
		Cobble content	0.85	Too steep for sprinkler	0.22
				irrigation	
BmD: Bermeja-----	70	Very limited Slope	1.00	Very limited Depth to bedrock	1.00
		Depth to bedrock	1.00	Cobble content	1.00
		Slow water movement	1.00	Too steep for surface	1.00
		Cobble content	1.00	application	
				Too steep for sprinkler	1.00
				irrigation	
				Too acid	0.55
Cerro Mariquita-----	20	Very limited Slope	1.00	Very limited Depth to bedrock	1.00
		Depth to bedrock	1.00	Too steep for surface	1.00
		Slow water movement	1.00	application	
		Cobble content	0.85	Too steep for sprinkler	1.00
				irrigation	

Soil Survey of San Germán Area, Puerto Rico

Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
BmF: Bermeja-----	75	Very limited Slope Depth to bedrock Slow water movement Cobble content	1.00 1.00 1.00 1.00	Very limited Depth to bedrock Cobble content Too steep for surface application Too steep for sprinkler irrigation Too acid	1.00 1.00 1.00 1.00 1.00 0.55
Cerro Mariquita-----	20	Very limited Slope Depth to bedrock Slow water movement Cobble content	1.00 1.00 1.00 0.85	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation	1.00 1.00 1.00
BrF: Bermeja-----	75	Very limited Slope Depth to bedrock Slow water movement Cobble content	1.00 1.00 1.00 1.00	Very limited Depth to bedrock Cobble content Too steep for surface application Too steep for sprinkler irrigation Too acid	1.00 1.00 1.00 1.00 0.55
Rock outcrop-----	15	Not rated		Not rated	
CaC: Cabo Rojo-----	90	Very limited Slow water movement Slope	1.00 0.88	Very limited Slow water movement Too steep for surface application Too acid Too steep for sprinkler irrigation	1.00 0.92 0.77 0.06
CbD: Caguabo-----	85	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation	1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
CbF: Caguabo-----	85	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation	1.00 1.00 1.00
CeA: Cartagena-----	85	Very limited Slow water movement Ponding	1.00 1.00	Very limited Sodium content Ponding Slow water movement Salinity	1.00 1.00 0.99 0.50
CgD: Casabe-----	90	Very limited Slow water movement Depth to bedrock Slope	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Slow water movement	1.00 1.00 1.00 0.99
CgF: Casabe-----	90	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Slow water movement	1.00 1.00 1.00 0.99
ChA: Cataño-----	95	Not limited		Not limited	
CjD: Cerro Gordo-----	90	Very limited Slope	1.00	Very limited Too acid Too steep for surface application Too steep for sprinkler irrigation Filtering capacity	1.00 1.00 1.00 0.99

Soil Survey of San Germán Area, Puerto Rico

Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
CkD: Cerro Mariquita-----	80	Very limited Slope Depth to bedrock Slow water movement Cobble content	1.00 1.00 1.00 0.85	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation	1.00 1.00 1.00 1.00
CkF: Cerro Mariquita-----	80	Very limited Slope Depth to bedrock Slow water movement Cobble content	1.00 1.00 1.00 0.85	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation	1.00 1.00 1.00 1.00
CmB: Coamo-----	90	Very limited Slow water movement Slope	1.00 1.00	Very limited Too steep for surface application Too steep for sprinkler irrigation Slow water movement	1.00 0.50 0.26
CoA: Coloso-----	90	Very limited Slow water movement Depth to saturated zone Flooding	1.00 1.00 0.60	Very limited Depth to saturated zone Slow water movement Flooding	0.99 0.96 0.60
CsE: Consumo-----	80	Very limited Slope Slow water movement Too acid	1.00 1.00 0.03	Very limited Too steep for surface application Too steep for sprinkler irrigation Too acid Slow water movement	1.00 1.00 1.00 1.00 0.99

Soil Survey of San Germán Area, Puerto Rico

Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
CsF: Consumo-----	80	Very limited Slope Slow water movement Too acid	1.00 1.00 0.03	Very limited Too steep for surface application Too steep for sprinkler irrigation Too acid Slow water movement	1.00 1.00 1.00 1.00 0.99
CtA: Cortada-----	98	Very limited Slow water movement Flooding	1.00 0.60	Somewhat limited Flooding Sodium content	0.60 0.08
CuD: Costa-----	67	Very limited Slow water movement Depth to bedrock Slope	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Slow water movement	1.00 1.00 1.00 0.99
Pitahaya-----	25	Very limited Slow water movement Depth to bedrock Slope	1.00 1.00 0.12	Very limited Depth to bedrock Slow water movement Too steep for surface application	1.00 0.99 0.32
CuF: Costa-----	67	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Slow water movement	1.00 1.00 1.00 0.99
Pitahaya-----	25	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Slow water movement	1.00 1.00 1.00 0.99

Soil Survey of San Germán Area, Puerto Rico

Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
CvF: Cuchillas-----	80	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation	1.00 1.00 1.00
CvG: Cuchillas-----	80	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation	1.00 1.00 1.00
DeD: Delicias-----	95	Very limited Slow water movement Slope	1.00 1.00	Very limited Too acid Too steep for surface application Too steep for sprinkler irrigation Low adsorption	1.00 1.00 1.00 0.58
DqA: Dique-----	90	Very limited Flooding Slow water movement	1.00 1.00	Very limited Flooding	1.00
DsC: Descalabrado-----	90	Very limited Slow water movement Depth to bedrock Slope	1.00 1.00 0.88	Very limited Depth to bedrock Slow water movement Too steep for surface application Too steep for sprinkler irrigation	1.00 0.99 0.92 0.06
DsD: Descalabrado-----	90	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Slow water movement	1.00 1.00 1.00 0.99

Soil Survey of San Germán Area, Puerto Rico

Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
DsF: Descalabrado-----	90	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Slow water movement	1.00 1.00 1.00 1.00 0.99
EcD: El Cacique-----	60	Very limited Slow water movement Depth to bedrock Slope	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Slow water movement	1.00 1.00 1.00 1.00 0.99
La Taína-----	30	Very limited Slow water movement Depth to bedrock Slope	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Slow water movement	1.00 1.00 1.00 1.00 0.99
EcF: El Cacique-----	60	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Slow water movement	1.00 1.00 1.00 1.00 0.99
La Taína-----	30	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Slow water movement	1.00 1.00 1.00 1.00 0.99

Soil Survey of San Germán Area, Puerto Rico

Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
EcG: El Cacique-----	60	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Slow water movement	1.00 1.00 1.00 0.99
La Taína-----	30	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Slow water movement	1.00 1.00 1.00 0.99
EdD: El Descanso-----	50	Very limited Depth to bedrock Slow water movement Slope	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Filtering capacity	1.00 1.00 1.00 0.99
Hoconuco-----	45	Very limited Slow water movement Depth to bedrock Slope	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Filtering capacity Slow water movement	1.00 1.00 1.00 0.99 0.99
EdF: El Descanso-----	50	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Filtering capacity	1.00 1.00 1.00 0.99

Soil Survey of San Germán Area, Puerto Rico

Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
EdF: Hoconuco-----	45	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Filtering capacity Slow water movement	1.00 1.00 1.00 0.99 0.99
EdG: El Descanso-----	50	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Filtering capacity	1.00 1.00 1.00 0.99
Hoconuco-----	45	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Filtering capacity Slow water movement	1.00 1.00 1.00 0.99 0.99
EpC: El Papayo-----	95	Very limited Slow water movement Depth to bedrock Slope	1.00 1.00 0.88	Very limited Depth to bedrock Slow water movement Too steep for surface application Too steep for sprinkler irrigation	1.00 0.99 0.92 0.06

Soil Survey of San Germán Area, Puerto Rico

Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
EpD: El Papayo-----	95	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Slow water movement	1.00 1.00 1.00 1.00 0.99
EpF: El Papayo-----	95	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Slow water movement	1.00 1.00 1.00 1.00 0.99
FeA: Fé-----	95	Very limited Slow water movement Depth to saturated zone	1.00 1.00	Very limited Sodium content Slow water movement Salinity	1.00 1.00 0.50
FrA: Fraternidad-----	90	Very limited Slow water movement	1.00	Very limited Slow water movement	1.00
FrB: Fraternidad-----	90	Very limited Slow water movement	1.00	Very limited Slow water movement	1.00
GbF: Guanábano-----	95	Very limited Slope Slow water movement	1.00 1.00	Very limited Too steep for surface application Too steep for sprinkler irrigation Slow water movement Too acid	1.00 1.00 1.00 0.99 0.07

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Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
GhC: Guanajibo-----	90	Very limited Slow water movement Slope Too acid	1.00 0.88 0.03	Very limited Too acid Slow water movement Too steep for surface application Low adsorption Too steep for sprinkler irrigation	0.99 0.96 0.92 0.60 0.06
GnA: Guánica-----	80	Very limited Ponding Slow water movement	1.00 1.00	Very limited Sodium content Slow water movement Ponding	1.00 1.00 1.00
GuB: Guayabo-----	90	Not limited		Very limited Filtering capacity	1.00
GyB: Guayacán-----	90	Very limited Slow water movement	1.00	Somewhat limited Slow water movement	0.99
GyC: Guayacán-----	90	Very limited Slow water movement Slope	1.00 1.00	Very limited Too steep for surface application Slow water movement Too steep for sprinkler irrigation	1.00 0.99 0.50
GyD: Guayacán-----	90	Very limited Slope Slow water movement	1.00 1.00	Very limited Too steep for surface application Too steep for sprinkler irrigation Slow water movement	1.00 1.00 0.99

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Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
HmD: Humatas-----	80	Very limited Slope Slow water movement Too acid	1.00 1.00 0.31	Very limited Too steep for surface application Too steep for sprinkler irrigation Slow water movement Too acid	1.00 1.00 1.00 0.99 0.77
HmE: Humatas-----	80	Very limited Slope Slow water movement Too acid	1.00 1.00 0.31	Very limited Too steep for surface application Too steep for sprinkler irrigation Slow water movement Too acid	1.00 1.00 1.00 0.99 0.77
HmF: Humatas-----	80	Very limited Slope Slow water movement Too acid	1.00 1.00 0.31	Very limited Too steep for surface application Too steep for sprinkler irrigation Slow water movement Too acid	1.00 1.00 1.00 0.99 0.77
JaB: Jácana-----	80	Very limited Slow water movement Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slow water movement Too steep for surface application	1.00 0.99 0.08
JaC: Jácana-----	80	Very limited Slow water movement Depth to bedrock Slope	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Slow water movement Too steep for sprinkler irrigation	1.00 1.00 0.99 0.50

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Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
JBA: Joyuda-----	50	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Depth to saturated zone Flooding Filtering capacity	1.00 1.00 0.99
Atolladero-----	30	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Depth to saturated zone Flooding Filtering capacity Salinity	1.00 1.00 0.99 0.50
Bajura-----	20	Very limited Flooding Slow water movement Depth to saturated zone	1.00 1.00 1.00	Very limited Slow water movement Depth to saturated zone Flooding	1.00 1.00 1.00
LcE: La Covana-----	60	Very limited Slope Slow water movement Depth to cemented pan	1.00 1.00 1.00	Very limited Depth to cemented pan Too steep for surface application Too steep for sprinkler irrigation Slow water movement	1.00 1.00 1.00 0.99
Limestone outcrop---	20	Not rated		Not rated	
Seboruco-----	15	Very limited Slope Slow water movement	1.00 1.00	Very limited Too steep for surface application Too steep for sprinkler irrigation Slow water movement	1.00 1.00 0.99
LdA: La Luna-----	90	Very limited Slow water movement Flooding	1.00 0.60	Somewhat limited Slow water movement Flooding Sodium content	0.99 0.60 0.08

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Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
LeF: La Tea-----	70	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Slow water movement Cobble content	1.00 1.00 1.00 0.99 0.50
LfC: Landfill-----	100	Not rated		Not rated	
LkB: Lares-----	80	Very limited Slow water movement Too acid	1.00 0.07	Very limited Too acid Slow water movement	1.00 0.99
LnA: Llanos Costa-----	75	Very limited Slow water movement	1.00	Somewhat limited Slow water movement Too acid	0.99 0.67
LnB: Llanos Costa-----	75	Very limited Slow water movement	1.00	Somewhat limited Slow water movement Too acid	0.99 0.67
LnC: Llanos Costa-----	75	Very limited Slow water movement Slope	1.00 0.88	Somewhat limited Slow water movement Too steep for surface application Too acid Too steep for sprinkler irrigation	0.99 0.92 0.67 0.06
LpG: Los Peñones-----	60	Very limited Slope Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Filtering capacity	1.00 1.00 1.00 0.99
Limestone outcrop---	40	Not rated		Not rated	

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Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
MaB: Mabí-----	70	Very limited Slow water movement Depth to saturated zone	1.00 1.00	Very limited Depth to saturated zone Too acid Slow water movement	1.00 0.99 0.96
MbA: Maguayo-----	80	Very limited Slow water movement	1.00	Very limited Slow water movement Too acid	1.00 0.42
MbC: Maguayo-----	80	Very limited Slow water movement Slope	1.00 1.00	Very limited Slow water movement Too steep for surface application Too acid Too steep for sprinkler irrigation	1.00 1.00 0.42 0.22
McF: Malaya-----	90	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Slow water movement Too acid	1.00 1.00 1.00 0.99 0.07
MDA: Manglillo-----	50	Very limited Flooding Slow water movement Depth to saturated zone	1.00 1.00 1.00	Very limited Depth to saturated zone Flooding Slow water movement	1.00 1.00 0.96
Boquerón-----	30	Very limited Flooding Slow water movement Depth to saturated zone	1.00 1.00 1.00	Very limited Depth to saturated zone Flooding Slow water movement	1.00 1.00 1.00
Serrano-----	20	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Sodium content Depth to saturated zone Flooding Salinity	1.00 1.00 1.00 0.50

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Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
MeA: Maní-----	80	Very limited Slow water movement Depth to saturated zone Flooding	1.00 1.00 0.60	Very limited Depth to saturated zone Slow water movement Flooding Too acid	0.99 0.99 0.60 0.14
MFF: Maresúa-----	80	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 1.00	Very limited Too steep for surface application Too steep for sprinkler irrigation Depth to bedrock	1.00 1.00 1.00 1.00
MgF: Maresúa-----	40	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 1.00	Very limited Too steep for surface application Too steep for sprinkler irrigation Depth to bedrock	1.00 1.00 1.00 1.00
Serpentine outcrop-----	40	Not rated		Not rated	
MiD: Mariana-----	95	Very limited Slope Slow water movement Too acid Too acid	1.00 1.00 0.67 0.67	Very limited Too steep for surface application Too steep for sprinkler irrigation Too acid Slow water movement	1.00 1.00 1.00 0.99
MiE: Mariana-----	95	Very limited Slope Slow water movement Too acid	1.00 1.00 0.67	Very limited Too steep for surface application Too steep for sprinkler irrigation Too acid Slow water movement	1.00 1.00 1.00 0.99

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Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
MkF: Maricao-----	80	Very limited Slope Slow water movement Too acid	1.00 1.00 0.07	Very limited Too steep for surface application Too steep for sprinkler irrigation Too acid Slow water movement	1.00 1.00 1.00 1.00 0.99
MkG: Maricao-----	80	Very limited Slope Slow water movement Too acid	1.00 1.00 0.07	Very limited Too steep for surface application Too steep for sprinkler irrigation Too acid Slow water movement	1.00 1.00 1.00 1.00 0.99
MnA: Melones-----	95	Very limited Slow water movement	1.00	Very limited Sodium content Slow water movement	1.00 0.99
MnC: Melones-----	95	Very limited Slow water movement Slope	1.00 1.00	Very limited Sodium content Too steep for surface application Slow water movement Too steep for sprinkler irrigation	1.00 1.00 0.99 0.50
MoB: Montalva-----	80	Very limited Slow water movement Depth to bedrock	1.00 1.00	Very limited Depth to bedrock Slow water movement	1.00 0.99
MoC: Montalva-----	80	Very limited Slow water movement Depth to bedrock Slope	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Slow water movement Too steep for sprinkler irrigation	1.00 1.00 0.99 0.50

Soil Survey of San Germán Area, Puerto Rico

Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
MqC: Monte grande-----	90	Very limited Slow water movement Depth to saturated zone Slope	1.00 1.00 0.88	Somewhat limited Slow water movement Too steep for surface application Depth to saturated zone Too steep for sprinkler irrigation	0.99 0.92 0.86 0.06
MrD: Morado-----	85	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Slow water movement Too steep for surface application Too steep for sprinkler irrigation Depth to bedrock	1.00 1.00 1.00 1.00 1.00
MrE: Morado-----	85	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Slow water movement Too steep for surface application Too steep for sprinkler irrigation Depth to bedrock	1.00 1.00 1.00 1.00 1.00
MrF: Morado-----	85	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Slow water movement Too steep for surface application Too steep for sprinkler irrigation Depth to bedrock	1.00 1.00 1.00 1.00 1.00
MuC: Múcara-----	80	Very limited Slow water movement Depth to bedrock Slope	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Slow water movement Too steep for sprinkler irrigation	1.00 1.00 0.99 0.50

Soil Survey of San Germán Area, Puerto Rico

Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
MuD: Múcara-----	80	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Too steep for surface application Too steep for sprinkler irrigation Depth to bedrock Slow water movement	1.00 1.00 1.00 1.00 0.99
MuE: Múcara-----	80	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Too steep for surface application Too steep for sprinkler irrigation Depth to bedrock Slow water movement	1.00 1.00 1.00 1.00 0.99
MuF: Múcara-----	80	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Too steep for surface application Too steep for sprinkler irrigation Depth to bedrock Slow water movement	1.00 1.00 1.00 1.00 0.99
NpD: Nipe-----	95	Very limited Slow water movement Slope	1.00 1.00	Very limited Low adsorption Too steep for surface application Too steep for sprinkler irrigation Too acid	1.00 1.00 1.00 0.99
OrA: Olivares-----	95	Very limited Ponding Slow water movement	1.00 1.00	Very limited Ponding Filtering capacity Slow water movement	1.00 0.99 0.99
PaA: Palmarejo-----	90	Very limited Slow water movement Too acid	1.00 0.14	Very limited Too acid Slow water movement	1.00 0.99

Soil Survey of San Germán Area, Puerto Rico

Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
PaB: Palmarejo-----	90	Very limited Slow water movement Too acid	1.00 0.14	Very limited Too acid Slow water movement	1.00 0.99
PaC: Palmarejo-----	90	Very limited Slow water movement Slope Too acid	1.00 1.00 0.14	Very limited Too acid Too steep for surface application Too steep for sprinkler irrigation	1.00 1.00 0.22
PgA: Parguera-----	80	Very limited Slow water movement	1.00	Somewhat limited Slow water movement	0.96
PgB: Parguera-----	80	Very limited Slow water movement	1.00	Somewhat limited Slow water movement Too steep for surface application	0.96 0.08
PsF: Pitahaya-----	60	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Slow water movement	1.00 1.00 1.00 0.99
Limestone outcrop---	20	Not rated		Not rated	
Seboruco-----	15	Very limited Slope Slow water movement	1.00 1.00	Very limited Too steep for surface application Too steep for sprinkler irrigation Slow water movement	1.00 1.00 0.99

Soil Survey of San Germán Area, Puerto Rico

Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
PsG: Pitahaya-----	60	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Slow water movement	1.00 1.00 1.00 0.99
Limestone outcrop---	20	Not rated		Not rated	
Seboruco-----	15	Very limited Slope Slow water movement	1.00 1.00	Very limited Too steep for surface application Too steep for sprinkler irrigation Slow water movement	1.00 1.00 0.99
Pt: Pits and quarries---	100	Not rated		Not rated	
PzB: Pozo Blanco-----	95	Very limited Slow water movement Stone content	1.00 1.00	Very limited Large stones on the surface Slow water movement	1.00 0.94
PzC: Pozo Blanco-----	95	Very limited Slow water movement Stone content Slope	1.00 1.00 1.00	Very limited Large stones on the surface Too steep for surface application Slow water movement Too steep for sprinkler irrigation	1.00 1.00 0.94 0.50
PzD: Pozo Blanco-----	95	Very limited Slope Slow water movement Stone content	1.00 1.00 1.00	Very limited Large stones on the surface Too steep for surface application Too steep for sprinkler irrigation Slow water movement	1.00 1.00 1.00 0.94

Soil Survey of San Germán Area, Puerto Rico

Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
QbD: Quebrada-----	95	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation	1.00 1.00 1.00
QbE: Quebrada-----	95	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation	1.00 1.00 1.00
QbF: Quebrada-----	95	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation	1.00 1.00 1.00
ReA: Reilly-----	95	Very limited Flooding Depth to saturated zone Slow water movement	1.00 1.00 0.32	Very limited Filtering capacity Flooding Depth to saturated zone	1.00 1.00 0.86
RoD: Rosario-----	80	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 1.00	Very limited Too steep for surface application Too steep for sprinkler irrigation Depth to bedrock Slow water movement	1.00 1.00 1.00 0.90
RoE: Rosario-----	80	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 1.00	Very limited Too steep for surface application Too steep for sprinkler irrigation Depth to bedrock Slow water movement	1.00 1.00 1.00 0.90

Soil Survey of San Germán Area, Puerto Rico

Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
RoF: Rosario-----	80	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 1.00	Very limited Too steep for surface application Too steep for sprinkler irrigation Depth to bedrock Slow water movement	1.00 1.00 1.00 1.00 0.90
RuF: Rubias-----	60	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Slow water movement	1.00 1.00 1.00 0.15
Chiquito-----	30	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation	1.00 1.00 1.00
RuG: Rubias-----	60	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation Slow water movement	1.00 1.00 1.00 0.15
Chiquito-----	30	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 1.00	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation	1.00 1.00 1.00
Sa: Salt flats, ponded---	100	Not rated		Not rated	
Sb: Salt pits-----	100	Not rated		Not rated	

Soil Survey of San Germán Area, Puerto Rico

Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
ScA: San Antón-----	95	Very limited Slow water movement Flooding	1.00 0.60	Somewhat limited Flooding	0.60
SdD: San Germán-----	95	Very limited Slow water movement Depth to bedrock Slope	1.00 1.00 1.00	Very limited Too steep for surface application Depth to bedrock Too steep for sprinkler irrigation Slow water movement	1.00 1.00 1.00 0.96
SdF: San Germán-----	95	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Too steep for surface application Too steep for sprinkler irrigation Depth to bedrock Slow water movement	1.00 1.00 1.00 0.96
SgD: San Germán-----	60	Very limited Slow water movement Depth to bedrock Slope	1.00 1.00 1.00	Very limited Too steep for surface application Depth to bedrock Too steep for sprinkler irrigation Slow water movement	1.00 1.00 1.00 0.96
Duey-----	40	Very limited Depth to bedrock Slope Slow water movement	1.00 1.00 0.32	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation	1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
SgF: San Germán-----	60	Very limited Slope Slow water movement Depth to bedrock	1.00 1.00 1.00	Very limited Too steep for surface application Too steep for sprinkler irrigation Depth to bedrock Slow water movement	1.00 1.00 1.00 1.00 0.96
Duey-----	40	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 0.32	Very limited Depth to bedrock Too steep for surface application Too steep for sprinkler irrigation	1.00 1.00 1.00
SiA: Santa Isabel-----	95	Very limited Slow water movement Depth to saturated zone	1.00 1.00	Very limited Slow water movement	1.00
SmE: Santa Marta-----	95	Very limited Slope Depth to bedrock Slow water movement	1.00 1.00 1.00	Very limited Too steep for surface application Too steep for sprinkler irrigation Depth to bedrock	1.00 1.00 1.00
SoC: Seboruco-----	90	Very limited Slow water movement Slope	1.00 0.88	Somewhat limited Slow water movement Too steep for surface application Too steep for sprinkler irrigation	0.99 0.92 0.06
SsB: Sosa-----	90	Very limited Slow water movement	1.00	Somewhat limited Slow water movement Too acid Too steep for surface application	0.99 0.55 0.08

Soil Survey of San Germán Area, Puerto Rico

Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
SsC: Sosa-----	90	Very limited Slow water movement Slope	1.00 1.00	Very limited Too steep for surface application Slow water movement Too acid Too steep for sprinkler irrigation	1.00 0.99 0.55 0.22
TeA: Teresa-----	95	Very limited Slow water movement	1.00	Somewhat limited Slow water movement Sodium content	0.99 0.92
TfA: Teresa, ponded-----	95	Very limited Slow water movement Ponding	1.00 1.00	Very limited Ponding Slow water movement Sodium content	1.00 0.99 0.92
ToA: Toa-----	90	Very limited Slow water movement Flooding	1.00 0.60	Somewhat limited Flooding	0.60
Ua: Urban land-----	100	Not rated		Not rated	
UbB: Urban land-----	85	Not rated		Not rated	
Bahía-----	10	Somewhat limited Slow water movement	0.32	Very limited Filtering capacity Too acid	0.99 0.96
UgB: Urban land-----	85	Not rated		Not rated	
Guayabo-----	10	Not limited		Very limited Filtering capacity	1.00

Soil Survey of San Germán Area, Puerto Rico

Table 18c.--Agricultural Waste Management (Part 3)--Continued

Map symbol and soil name	Pct. of map unit	Rapid infiltration of wastewater		Slow rate treatment of wastewater	
		Rating class and limiting features	Value	Rating class and limiting features	Value
UsC: Urban land-----	80	Not rated		Not rated	
Sosa-----	15	Very limited Slow water movement Slope	1.00 1.00	Very limited Too steep for surface application Slow water movement Too acid Too steep for sprinkler irrigation	1.00 0.99 0.55 0.22
VaA: Vayas-----	90	Very limited Slow water movement Depth to saturated zone Flooding	1.00 1.00 0.60	Very limited Depth to saturated zone Slow water movement Flooding Sodium content	1.00 0.96 0.60 0.08
VoC: Voladora-----	90	Very limited Slow water movement Slope Too acid	1.00 1.00 0.21	Very limited Too steep for surface application Slow water movement Too acid Too steep for sprinkler irrigation	1.00 0.99 0.77 0.50
VoD: Voladora-----	90	Very limited Slope Slow water movement Too acid	1.00 1.00 0.21	Very limited Too steep for surface application Too steep for sprinkler irrigation Slow water movement Too acid	1.00 1.00 0.99 0.77
W: Water-----	100	Not rated		Not rated	

Soil Survey of San Germán Area, Puerto Rico

Table 19.--Large Animal Disposal

[The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table]

Map symbol and soil name	Pct. of map unit	Animal disposal pit		Animal disposal trench	
		Rating class and limiting features	Value	Rating class and limiting features	Value
AbF: Agüeybaná-----	85	Very limited Slope Too clayey Water gathering	1.00 1.00 0.17	Very limited Slope Too clayey Water gathering	1.00 1.00 0.17
AgD: Aguilita-----	90	Very limited Depth to bedrock Slope Cutbanks cave	1.00 1.00 0.01	Very limited Depth to bedrock Slope Cutbanks cave	1.00 0.84 0.01
AgF: Aguilita-----	80	Very limited Slope Depth to bedrock Seepage, porous bedrock	1.00 1.00 0.50	Very limited Slope Depth to bedrock Seepage, porous bedrock	1.00 1.00 0.50
AkA: Aguirre-----	95	Very limited Ponding Cutbanks cave Clay content	1.00 1.00 0.50	Very limited Ponding Cutbanks cave Clay content	1.00 1.00 0.50
AlF: Aljibe-----	40	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.94	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.94
Guamá-----	30	Very limited Slope Too clayey Water gathering	1.00 1.00 0.17	Very limited Slope Too clayey Water gathering	1.00 1.00 0.17
Indiera-----	25	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00
AtD: Altamira-----	85	Very limited Depth to bedrock Seepage, porous bedrock Slope	1.00 0.50 0.37	Very limited Depth to bedrock Seepage, porous bedrock Cutbanks cave	1.00 0.50 0.31
AtF: Altamira-----	85	Very limited Slope Depth to bedrock Seepage, porous bedrock	1.00 1.00 0.50	Very limited Slope Depth to bedrock Seepage, porous bedrock	1.00 1.00 0.50

Soil Survey of San Germán Area, Puerto Rico

Table 19.--Large Animal Disposal--Continued

Map symbol and soil name	Pct. of map unit	Animal disposal pit		Animal disposal trench	
		Rating class and limiting features	Value	Rating class and limiting features	Value
BaB: Bahía-----	90	Somewhat limited Sand content Cutbanks cave Water gathering	0.45 0.07 0.03	Somewhat limited Sand content Cutbanks cave Water gathering	0.45 0.07 0.03
BhB: Bahía Salinas-----	90	Very limited Too sandy Cutbanks cave Water gathering	1.00 1.00 0.03	Very limited Too sandy Cutbanks cave Water gathering	1.00 1.00 0.03
BjA: Bajura-----	90	Very limited Flooding Wetness Cutbanks cave	1.00 1.00 1.00	Very limited Flooding Wetness Cutbanks cave	1.00 1.00 1.00
BkB: Beaches-----	100	Not rated		Not rated	
BmC: Bermeja-----	70	Very limited Depth to bedrock Large stones content Slope	1.00 0.74 0.37	Very limited Depth to bedrock Large stones content Adsorption	1.00 0.74 0.25
Cerro Mariquita-----	20	Very limited Depth to bedrock Slope Cutbanks cave	1.00 0.37 0.14	Very limited Depth to bedrock Cutbanks cave Clay content	1.00 0.14 0.10
BmD: Bermeja-----	70	Very limited Slope Depth to bedrock Large stones content	1.00 1.00 0.74	Very limited Depth to bedrock Slope Large stones content	1.00 1.00 0.74
Cerro Mariquita-----	20	Very limited Slope Depth to bedrock Cutbanks cave	1.00 1.00 0.14	Very limited Depth to bedrock Slope Cutbanks cave	1.00 1.00 0.14
BmF: Bermeja-----	75	Very limited Slope Depth to bedrock Large stones content	1.00 1.00 0.74	Very limited Slope Depth to bedrock Large stones content	1.00 1.00 0.74
Cerro Mariquita-----	20	Very limited Slope Depth to bedrock Cutbanks cave	1.00 1.00 0.14	Very limited Slope Depth to bedrock Cutbanks cave	1.00 1.00 0.14

Soil Survey of San Germán Area, Puerto Rico

Table 19.--Large Animal Disposal--Continued

Map symbol and soil name	Pct. of map unit	Animal disposal pit		Animal disposal trench	
		Rating class and limiting features	Value	Rating class and limiting features	Value
BrF: Bermeja-----	75	Very limited Slope Depth to bedrock Rock outcrop	1.00 1.00 1.00	Very limited Slope Depth to bedrock Rock outcrop	1.00 1.00 1.00
Rock outcrop-----	15	Not rated		Not rated	
CaC: Cabo Rojo-----	90	Somewhat limited Clay content Slope Cutbanks cave	0.80 0.16 0.01	Somewhat limited Clay content Cutbanks cave	0.80 0.01
CbD: Caguabo-----	85	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.12	Very limited Depth to bedrock Slope Clay content	1.00 1.00 0.12
CbF: Caguabo-----	85	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.12	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.12
CeA: Cartagena-----	85	Very limited Ponding Cutbanks cave Excess sodium	1.00 1.00 1.00	Very limited Ponding Cutbanks cave Excess sodium	1.00 1.00 1.00
CgD: Casabe-----	90	Very limited Depth to bedrock Slope Adsorption	1.00 1.00 0.25	Very limited Depth to bedrock Slope Adsorption	1.00 1.00 0.25
CgF: Casabe-----	90	Very limited Slope Depth to bedrock Adsorption	1.00 1.00 0.25	Very limited Slope Depth to bedrock Adsorption	1.00 1.00 0.25
ChA: Cataño-----	95	Very limited Too sandy Cutbanks cave Seepage	1.00 1.00 1.00	Very limited Too sandy Cutbanks cave Seepage	1.00 1.00 1.00
CjD: Cerro Gordo-----	90	Very limited Slope Seepage Clay content	1.00 1.00 0.24	Very limited Seepage Slope Clay content	1.00 0.63 0.24
CkD: Cerro Mariquita-----	80	Very limited Slope Depth to bedrock Cutbanks cave	1.00 1.00 0.14	Very limited Depth to bedrock Slope Cutbanks cave	1.00 1.00 0.14

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Table 19.--Large Animal Disposal--Continued

Map symbol and soil name	Pct. of map unit	Animal disposal pit		Animal disposal trench	
		Rating class and limiting features	Value	Rating class and limiting features	Value
CkF: Cerro Mariquita-----	80	Very limited Slope Depth to bedrock Cutbanks cave	1.00 1.00 0.14	Very limited Slope Depth to bedrock Cutbanks cave	1.00 1.00 0.14
CmB: Coamo-----	90	Very limited Seepage Slope Water gathering	1.00 0.63 0.10	Very limited Seepage Water gathering Slope	1.00 0.10 0.04
CoA: Coloso-----	90	Very limited Flooding Wetness Cutbanks cave	1.00 1.00 1.00	Very limited Flooding Wetness Cutbanks cave	1.00 1.00 1.00
CsE: Consumo-----	80	Very limited Slope Clay content Water gathering	1.00 0.77 0.13	Very limited Slope Clay content Water gathering	1.00 0.77 0.13
CsF: Consumo-----	80	Very limited Slope Clay content Water gathering	1.00 0.77 0.13	Very limited Slope Clay content Water gathering	1.00 0.77 0.13
CtA: Cortada-----	98	Very limited Flooding Water gathering Cutbanks cave	1.00 0.10 0.01	Very limited Flooding Water gathering Cutbanks cave	1.00 0.10 0.01
CuD: Costa-----	67	Very limited Depth to bedrock Slope Clay content	1.00 1.00 0.99	Very limited Depth to bedrock Slope Clay content	1.00 1.00 0.99
Pitahaya-----	25	Very limited Depth to bedrock Too clayey Seepage, porous bedrock	1.00 1.00 0.50	Very limited Depth to bedrock Too clayey Seepage, porous bedrock	1.00 1.00 0.50
CuF: Costa-----	67	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.99	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.99
Pitahaya-----	25	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00

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Table 19.--Large Animal Disposal--Continued

Map symbol and soil name	Pct. of map unit	Animal disposal pit		Animal disposal trench	
		Rating class and limiting features	Value	Rating class and limiting features	Value
CvF: Cuchillas-----	80	Very limited Slope Depth to bedrock Water gathering	1.00 1.00 0.13	Very limited Slope Depth to bedrock Water gathering	1.00 1.00 0.13
CvG: Cuchillas-----	80	Very limited Slope Depth to bedrock Water gathering	1.00 1.00 0.13	Very limited Slope Depth to bedrock Water gathering	1.00 1.00 0.13
DeD: Delicias-----	95	Very limited Slope Clay content Adsorption	1.00 0.80 0.16	Somewhat limited Slope Clay content Adsorption	0.84 0.80 0.16
DqA: Dique-----	90	Very limited Flooding Water gathering Cutbanks cave	1.00 0.13 0.01	Very limited Flooding Water gathering Cutbanks cave	1.00 0.13 0.01
DsC: Descalabrado-----	90	Very limited Depth to bedrock Adsorption Slope	1.00 0.25 0.16	Very limited Depth to bedrock Adsorption Cutbanks cave	1.00 0.25 0.01
DsD: Descalabrado-----	90	Very limited Slope Depth to bedrock Adsorption	1.00 1.00 0.25	Very limited Depth to bedrock Slope Adsorption	1.00 1.00 0.25
DsF: Descalabrado-----	90	Very limited Slope Depth to bedrock Adsorption	1.00 1.00 0.25	Very limited Slope Depth to bedrock Adsorption	1.00 1.00 0.25
EcD: El Cacique-----	60	Very limited Depth to bedrock Slope Adsorption	1.00 1.00 0.25	Very limited Depth to bedrock Slope Adsorption	1.00 0.84 0.25
La Taína-----	30	Very limited Depth to bedrock Slope Clay content	1.00 1.00 0.78	Very limited Depth to bedrock Slope Clay content	1.00 0.84 0.78
EcF: El Cacique-----	60	Very limited Slope Depth to bedrock Adsorption	1.00 1.00 0.25	Very limited Slope Depth to bedrock Adsorption	1.00 1.00 0.25

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Table 19.--Large Animal Disposal--Continued

Map symbol and soil name	Pct. of map unit	Animal disposal pit		Animal disposal trench	
		Rating class and limiting features	Value	Rating class and limiting features	Value
EcF: La Taína-----	30	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.78	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.78
EcG: El Cacique-----	60	Very limited Slope Depth to bedrock Adsorption	1.00 1.00 0.25	Very limited Slope Depth to bedrock Adsorption	1.00 1.00 0.25
La Taína-----	30	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.78	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.78
EdD: El Descanso-----	50	Very limited Depth to bedrock Slope Organic matter content	1.00 1.00 1.00	Very limited Depth to bedrock Organic matter content Cutbanks cave	1.00 1.00 0.89
Hoconuco-----	45	Very limited Depth to bedrock Slope Water gathering	1.00 1.00 0.17	Very limited Depth to bedrock Slope Water gathering	1.00 0.84 0.17
EdF: El Descanso-----	50	Very limited Slope Depth to bedrock Organic matter content	1.00 1.00 1.00	Very limited Slope Depth to bedrock Organic matter content	1.00 1.00 1.00
Hoconuco-----	45	Very limited Slope Depth to bedrock Water gathering	1.00 1.00 0.17	Very limited Slope Depth to bedrock Water gathering	1.00 1.00 0.17
EdG: El Descanso-----	50	Very limited Slope Depth to bedrock Organic matter content	1.00 1.00 1.00	Very limited Slope Depth to bedrock Organic matter content	1.00 1.00 1.00
Hoconuco-----	45	Very limited Slope Depth to bedrock Water gathering	1.00 1.00 0.17	Very limited Slope Depth to bedrock Water gathering	1.00 1.00 0.17
EpC: El Papayo-----	95	Very limited Depth to bedrock Cutbanks cave Clay content	1.00 0.51 0.50	Very limited Depth to bedrock Cutbanks cave Clay content	1.00 0.51 0.50

Soil Survey of San Germán Area, Puerto Rico

Table 19.--Large Animal Disposal--Continued

Map symbol and soil name	Pct. of map unit	Animal disposal pit		Animal disposal trench	
		Rating class and limiting features	Value	Rating class and limiting features	Value
EpD: El Papayo-----	95	Very limited Slope Depth to bedrock Cutbanks cave	1.00 1.00 0.51	Very limited Depth to bedrock Slope Cutbanks cave	1.00 1.00 0.51
EpF: El Papayo-----	95	Very limited Slope Depth to bedrock Cutbanks cave	1.00 1.00 0.51	Very limited Slope Depth to bedrock Cutbanks cave	1.00 1.00 0.51
FeA: Fé-----	95	Very limited Wetness Excess sodium Cutbanks cave	1.00 1.00 1.00	Very limited Wetness Excess sodium Cutbanks cave	1.00 1.00 1.00
FrA: Fraternidad-----	90	Very limited Cutbanks cave Clay content Water gathering	1.00 0.50 0.10	Very limited Cutbanks cave Clay content Water gathering	1.00 0.50 0.10
FrB: Fraternidad-----	90	Very limited Cutbanks cave Clay content Water gathering	1.00 0.50 0.10	Very limited Cutbanks cave Clay content Water gathering	1.00 0.50 0.10
GbF: Guanábano-----	95	Very limited Slope Seepage Clay content	1.00 0.50 0.50	Very limited Slope Seepage Clay content	1.00 0.50 0.50
GhC: Guanajibo-----	90	Somewhat limited Clay content Adsorption Slope	0.80 0.24 0.16	Somewhat limited Clay content Adsorption Water gathering	0.80 0.24 0.13
GnA: Guánica-----	80	Very limited Ponding Excess sodium Too clayey	1.00 1.00 1.00	Very limited Ponding Excess sodium Too clayey	1.00 1.00 1.00
GuB: Guayabo-----	90	Very limited Too sandy Cutbanks cave Water gathering	1.00 1.00 0.03	Very limited Too sandy Cutbanks cave Water gathering	1.00 1.00 0.03
GyB: Guayacán-----	90	Very limited Excess salt Seepage, porous bedrock Water gathering	1.00 0.50 0.10	Very limited Excess salt Seepage, porous bedrock Water gathering	1.00 0.50 0.10

Soil Survey of San Germán Area, Puerto Rico

Table 19.--Large Animal Disposal--Continued

Map symbol and soil name	Pct. of map unit	Animal disposal pit		Animal disposal trench	
		Rating class and limiting features	Value	Rating class and limiting features	Value
GyC: Guayacán-----	90	Very limited Excess salt Slope Seepage, porous bedrock	1.00 0.63 0.50	Very limited Excess salt Seepage, porous bedrock Water gathering	1.00 0.50 0.10
GyD: Guayacán-----	90	Very limited Slope Excess salt Seepage, porous bedrock	1.00 1.00 0.50	Very limited Slope Excess salt Seepage, porous bedrock	1.00 1.00 0.50
HmD: Humatas-----	80	Very limited Slope Clay content Water gathering	1.00 0.80 0.13	Very limited Slope Clay content Water gathering	1.00 0.80 0.13
HmE: Humatas-----	80	Very limited Slope Clay content Water gathering	1.00 0.80 0.13	Very limited Slope Clay content Water gathering	1.00 0.80 0.13
HmF: Humatas-----	80	Very limited Slope Clay content Water gathering	1.00 0.80 0.13	Very limited Slope Clay content Water gathering	1.00 0.80 0.13
JaB: Jácana-----	80	Very limited Depth to bedrock Clay content Cutbanks cave	1.00 0.50 0.09	Very limited Depth to bedrock Clay content Cutbanks cave	1.00 0.50 0.09
JaC: Jácana-----	80	Very limited Depth to bedrock Slope Clay content	1.00 0.63 0.50	Very limited Depth to bedrock Clay content Cutbanks cave	1.00 0.50 0.09
JBA: Joyuda-----	50	Very limited Flooding Wetness Seepage	1.00 1.00 1.00	Very limited Flooding Wetness Seepage	1.00 1.00 1.00
Atolladero-----	30	Very limited Flooding Wetness Seepage	1.00 1.00 1.00	Very limited Flooding Wetness Seepage	1.00 1.00 1.00
Bajura-----	20	Very limited Flooding Wetness Cutbanks cave	1.00 1.00 1.00	Very limited Flooding Wetness Cutbanks cave	1.00 1.00 1.00

Soil Survey of San Germán Area, Puerto Rico

Table 19.--Large Animal Disposal--Continued

Map symbol and soil name	Pct. of map unit	Animal disposal pit		Animal disposal trench	
		Rating class and limiting features	Value	Rating class and limiting features	Value
LcE: La Covana-----	60	Very limited Slope Depth to thin cemented pan Seepage, porous bedrock	1.00 0.50 0.50	Very limited Slope Depth to thin cemented pan Seepage, porous bedrock	1.00 0.50 0.50
Limestone outcrop---	20	Not rated		Not rated	
Seboruco-----	15	Very limited Slope Water gathering Cutbanks cave	1.00 0.03 0.01	Very limited Slope Water gathering Cutbanks cave	1.00 0.03 0.01
LdA: La Luna-----	90	Very limited Flooding Clay content Water gathering	1.00 0.39 0.10	Very limited Flooding Clay content Water gathering	1.00 0.39 0.10
LeF: La Tea-----	70	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00
LfC: Landfill-----	100	Not rated		Not rated	
LkB: Lares-----	80	Somewhat limited Clay content Water gathering Cutbanks cave	0.80 0.13 0.01	Somewhat limited Clay content Water gathering Cutbanks cave	0.80 0.13 0.01
LnA: Llanos Costa-----	75	Somewhat limited Clay content Water gathering Cutbanks cave	0.37 0.20 0.01	Somewhat limited Clay content Water gathering Cutbanks cave	0.37 0.20 0.01
LnB: Llanos Costa-----	75	Somewhat limited Clay content Water gathering Cutbanks cave	0.37 0.20 0.01	Somewhat limited Clay content Water gathering Cutbanks cave	0.37 0.20 0.01
LnC: Llanos Costa-----	75	Somewhat limited Clay content Water gathering Slope	0.37 0.20 0.16	Somewhat limited Clay content Water gathering Cutbanks cave	0.37 0.20 0.01
LpG: Los Peñones-----	60	Very limited Slope Depth to bedrock Organic matter content	1.00 1.00 1.00	Very limited Slope Depth to bedrock Organic matter content	1.00 1.00 1.00
Limestone outcrop---	40	Not rated		Not rated	

Soil Survey of San Germán Area, Puerto Rico

Table 19.--Large Animal Disposal--Continued

Map symbol and soil name	Pct. of map unit	Animal disposal pit		Animal disposal trench	
		Rating class and limiting features	Value	Rating class and limiting features	Value
MaB: Mabí-----	70	Very limited Wetness Cutbanks cave Clay content	1.00 1.00 0.80	Very limited Wetness Cutbanks cave Clay content	1.00 1.00 0.80
MbA: Maguayo-----	80	Somewhat limited Clay content Cutbanks cave Water gathering	0.50 0.29 0.10	Somewhat limited Clay content Cutbanks cave Water gathering	0.50 0.29 0.10
MbC: Maguayo-----	80	Somewhat limited Clay content Slope Cutbanks cave	0.50 0.37 0.29	Somewhat limited Clay content Cutbanks cave Water gathering	0.50 0.29 0.10
McF: Malaya-----	90	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.80	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.80
MDA: Manglillo-----	50	Very limited Flooding Wetness Water gathering	1.00 1.00 0.17	Very limited Flooding Wetness Water gathering	1.00 1.00 0.17
Boquerón-----	30	Very limited Flooding Wetness Too clayey	1.00 1.00 1.00	Very limited Flooding Wetness Too clayey	1.00 1.00 1.00
Serrano-----	20	Very limited Flooding Wetness Excess sodium	1.00 1.00 1.00	Very limited Flooding Wetness Excess sodium	1.00 1.00 1.00
MeA: Maní-----	80	Very limited Flooding Wetness Clay content	1.00 1.00 0.80	Very limited Flooding Wetness Clay content	1.00 1.00 0.80
MFF: Maresúa-----	80	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.77	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.77
MgF: Maresúa-----	40	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.77	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.77
Serpentinite outcrop-----	40	Not rated		Not rated	

Soil Survey of San Germán Area, Puerto Rico

Table 19.--Large Animal Disposal--Continued

Map symbol and soil name	Pct. of map unit	Animal disposal pit		Animal disposal trench	
		Rating class and limiting features	Value	Rating class and limiting features	Value
Mid: Mariana-----	95	Very limited Slope Clay content Water gathering	1.00 0.80 0.13	Very limited Slope Clay content Water gathering	1.00 0.80 0.13
MiE: Mariana-----	95	Very limited Slope Clay content Water gathering	1.00 0.80 0.13	Very limited Slope Clay content Water gathering	1.00 0.80 0.13
MkF: Maricao-----	80	Very limited Slope Clay content Cutbanks cave	1.00 0.80 0.01	Very limited Slope Clay content Cutbanks cave	1.00 0.80 0.01
MkG: Maricao-----	80	Very limited Slope Clay content Cutbanks cave	1.00 0.80 0.01	Very limited Slope Clay content Cutbanks cave	1.00 0.80 0.01
MnA: Melones-----	95	Somewhat limited Clay content Cutbanks cave Water gathering	0.50 0.37 0.30	Somewhat limited Clay content Cutbanks cave Water gathering	0.50 0.37 0.30
MnC: Melones-----	95	Somewhat limited Slope Clay content Cutbanks cave	0.63 0.50 0.37	Somewhat limited Clay content Cutbanks cave Water gathering	0.50 0.37 0.30
MoB: Montalva-----	80	Very limited Depth to bedrock Clay content Cutbanks cave	1.00 0.50 0.24	Very limited Depth to bedrock Clay content Cutbanks cave	1.00 0.50 0.24
MoC: Montalva-----	80	Very limited Depth to bedrock Slope Clay content	1.00 0.63 0.50	Very limited Depth to bedrock Clay content Cutbanks cave	1.00 0.50 0.24
MqC: Montegrando-----	90	Very limited Wetness Cutbanks cave Clay content	1.00 1.00 0.80	Very limited Wetness Cutbanks cave Clay content	1.00 1.00 0.80
MrD: Morado-----	85	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.75	Very limited Depth to bedrock Slope Clay content	1.00 1.00 0.75

Soil Survey of San Germán Area, Puerto Rico

Table 19.--Large Animal Disposal--Continued

Map symbol and soil name	Pct. of map unit	Animal disposal pit		Animal disposal trench	
		Rating class and limiting features	Value	Rating class and limiting features	Value
MrE: Morado-----	85	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.75	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.75
MrF: Morado-----	85	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.75	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.75
MuC: Múcara-----	80	Very limited Depth to bedrock Slope Cutbanks cave	1.00 0.63 0.01	Very limited Depth to bedrock Slope Cutbanks cave	1.00 0.04 0.01
MuD: Múcara-----	80	Very limited Slope Depth to bedrock Cutbanks cave	1.00 1.00 0.01	Very limited Depth to bedrock Slope Cutbanks cave	1.00 1.00 0.01
MuE: Múcara-----	80	Very limited Slope Depth to bedrock Cutbanks cave	1.00 1.00 0.01	Very limited Slope Depth to bedrock Cutbanks cave	1.00 1.00 0.01
MuF: Múcara-----	80	Very limited Slope Depth to bedrock Cutbanks cave	1.00 1.00 0.01	Very limited Slope Depth to bedrock Cutbanks cave	1.00 1.00 0.01
NpD: Nipe-----	95	Very limited Slope Clay content Adsorption	1.00 0.80 0.25	Somewhat limited Slope Clay content Adsorption	0.84 0.80 0.25
OrA: Olivares-----	95	Very limited Ponding Clay content Water gathering	1.00 0.80 0.27	Very limited Ponding Clay content Water gathering	1.00 0.80 0.27
PaA: Palmarejo-----	90	Somewhat limited Clay content Water gathering Cutbanks cave	0.36 0.10 0.01	Somewhat limited Clay content Water gathering Cutbanks cave	0.36 0.10 0.01
PaB: Palmarejo-----	90	Somewhat limited Clay content Water gathering Cutbanks cave	0.36 0.10 0.01	Somewhat limited Clay content Water gathering Cutbanks cave	0.36 0.10 0.01

Soil Survey of San Germán Area, Puerto Rico

Table 19.--Large Animal Disposal--Continued

Map symbol and soil name	Pct. of map unit	Animal disposal pit		Animal disposal trench	
		Rating class and limiting features	Value	Rating class and limiting features	Value
PaC: Palmarejo-----	90	Somewhat limited Slope Clay content Water gathering	0.37 0.36 0.10	Somewhat limited Clay content Water gathering Cutbanks cave	0.36 0.10 0.01
PgA: Parguera-----	80	Somewhat limited Clay content Water gathering Cutbanks cave	0.32 0.10 0.01	Somewhat limited Clay content Water gathering Cutbanks cave	0.32 0.10 0.01
PgB: Parguera-----	80	Somewhat limited Clay content Water gathering Cutbanks cave	0.32 0.10 0.01	Somewhat limited Clay content Water gathering Cutbanks cave	0.32 0.10 0.01
PsF: Pitahaya-----	60	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00
Limestone outcrop---	20	Not rated		Not rated	
Seboruco-----	15	Very limited Slope Water gathering Cutbanks cave	1.00 0.10 0.01	Very limited Slope Water gathering Cutbanks cave	1.00 0.10 0.01
PsG: Pitahaya-----	60	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00	Very limited Slope Depth to bedrock Too clayey	1.00 1.00 1.00
Limestone outcrop---	20	Not rated		Not rated	
Seboruco-----	15	Very limited Slope Water gathering Cutbanks cave	1.00 0.10 0.01	Very limited Slope Water gathering Cutbanks cave	1.00 0.10 0.01
Pt: Pits and quarries---	100	Not rated		Not rated	
PzB: Pozo Blanco-----	95	Very limited Too stony Seepage, porous bedrock Large stones content	1.00 0.50 0.30	Very limited Too stony Seepage, porous bedrock Large stones content	1.00 0.50 0.30
PzC: Pozo Blanco-----	95	Very limited Too stony Slope Seepage, porous bedrock	1.00 0.63 0.50	Very limited Too stony Seepage, porous bedrock Large stones content	1.00 0.50 0.30

Soil Survey of San Germán Area, Puerto Rico

Table 19.--Large Animal Disposal--Continued

Map symbol and soil name	Pct. of map unit	Animal disposal pit		Animal disposal trench	
		Rating class and limiting features	Value	Rating class and limiting features	Value
PzD: Pozo Blanco-----	95	Very limited Slope Too stony Seepage, porous bedrock	1.00 1.00 0.50	Very limited Too stony Slope Seepage, porous bedrock	1.00 1.00 0.50
QbD: Quebrada-----	95	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.80	Very limited Depth to bedrock Slope Clay content	1.00 1.00 0.80
QbE: Quebrada-----	95	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.80	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.80
QbF: Quebrada-----	95	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.80	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.80
ReA: Reilly-----	95	Very limited Flooding Wetness Seepage	1.00 1.00 1.00	Very limited Flooding Wetness Seepage	1.00 1.00 1.00
RoD: Rosario-----	80	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.68	Very limited Depth to bedrock Slope Clay content	1.00 1.00 0.68
RoE: Rosario-----	80	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.68	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.68
RoF: Rosario-----	80	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.68	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.68
RuF: Rubias-----	60	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.02	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.02
Chiquito-----	30	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.07	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.07

Soil Survey of San Germán Area, Puerto Rico

Table 19.--Large Animal Disposal--Continued

Map symbol and soil name	Pct. of map unit	Animal disposal pit		Animal disposal trench	
		Rating class and limiting features	Value	Rating class and limiting features	Value
RuG:					
Rubias-----	60	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.02	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.02
Chiquito-----	30	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.07	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.07
Sa:					
Salt flats, ponded---	100	Not rated		Not rated	
Sb:					
Salt pits-----	100	Not rated		Not rated	
ScA:					
San Antón-----	95	Very limited Flooding Seepage Water gathering	1.00 0.21 0.10	Very limited Flooding Seepage Water gathering	1.00 0.21 0.10
SdD:					
San Germán-----	95	Very limited Depth to bedrock Slope Seepage, porous bedrock	1.00 1.00 0.50	Very limited Depth to bedrock Slope Seepage, porous bedrock	1.00 0.84 0.50
SdF:					
San Germán-----	95	Very limited Slope Depth to bedrock Seepage, porous bedrock	1.00 1.00 0.50	Very limited Slope Depth to bedrock Seepage, porous bedrock	1.00 1.00 0.50
SgD:					
San Germán-----	60	Very limited Depth to bedrock Slope Seepage, porous bedrock	1.00 1.00 0.50	Very limited Depth to bedrock Slope Seepage, porous bedrock	1.00 0.84 0.50
Duey-----	40	Very limited Depth to bedrock Slope Seepage	1.00 1.00 0.50	Very limited Depth to bedrock Slope Seepage	1.00 0.84 0.50
SgF:					
San Germán-----	60	Very limited Slope Depth to bedrock Seepage, porous bedrock	1.00 1.00 0.50	Very limited Slope Depth to bedrock Seepage, porous bedrock	1.00 1.00 0.50
Duey-----	40	Very limited Slope Depth to bedrock Seepage	1.00 1.00 0.50	Very limited Slope Depth to bedrock Seepage	1.00 1.00 0.50

Soil Survey of San Germán Area, Puerto Rico

Table 19.--Large Animal Disposal--Continued

Map symbol and soil name	Pct. of map unit	Animal disposal pit		Animal disposal trench	
		Rating class and limiting features	Value	Rating class and limiting features	Value
SiA: Santa Isabel-----	95	Very limited Wetness Cutbanks cave Clay content	1.00 1.00 0.50	Very limited Wetness Cutbanks cave Clay content	1.00 1.00 0.50
SmE: Santa Marta-----	95	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.73	Very limited Slope Depth to bedrock Clay content	1.00 1.00 0.73
SoC: Seboruco-----	90	Somewhat limited Slope Water gathering Cutbanks cave	0.16 0.03 0.01	Somewhat limited Water gathering Cutbanks cave	0.03 0.01
SsB: Sosa-----	90	Somewhat limited Water gathering Adsorption Clay content	0.10 0.09 0.02	Somewhat limited Water gathering Adsorption Clay content	0.10 0.09 0.02
SsC: Sosa-----	90	Somewhat limited Slope Water gathering Adsorption	0.37 0.10 0.09	Somewhat limited Water gathering Adsorption Clay content	0.10 0.09 0.02
TeA: Teresa-----	95	Somewhat limited Clay content Cutbanks cave Water gathering	0.50 0.49 0.10	Somewhat limited Clay content Cutbanks cave Water gathering	0.50 0.49 0.10
TfA: Teresa, ponded-----	95	Very limited Ponding Clay content Cutbanks cave	1.00 0.50 0.49	Very limited Ponding Clay content Cutbanks cave	1.00 0.50 0.49
ToA: Toa-----	90	Very limited Flooding Clay content Water gathering	1.00 0.62 0.13	Very limited Flooding Clay content Water gathering	1.00 0.62 0.13
Ua: Urban land-----	100	Not rated		Not rated	
UdB: Urban land-----	85	Not rated		Not rated	
Bahía-----	10	Somewhat limited Sand content Cutbanks cave Water gathering	0.45 0.07 0.03	Somewhat limited Sand content Cutbanks cave Water gathering	0.45 0.07 0.03

Soil Survey of San Germán Area, Puerto Rico

Table 19.--Large Animal Disposal--Continued

Map symbol and soil name	Pct. of map unit	Animal disposal pit		Animal disposal trench	
		Rating class and limiting features	Value	Rating class and limiting features	Value
UgB:					
Urban land-----	85	Not rated		Not rated	
Guayabo-----	10	Very limited		Very limited	
		Too sandy	1.00	Too sandy	1.00
		Cutbanks cave	1.00	Cutbanks cave	1.00
		Water gathering	0.03	Water gathering	0.03
UsC:					
Urban land-----	80	Not rated		Not rated	
Sosa-----	15	Somewhat limited		Somewhat limited	
		Slope	0.37	Water gathering	0.10
		Water gathering	0.10	Adsorption	0.09
		Adsorption	0.09	Clay content	0.02
VaA:					
Vayas-----	90	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Wetness	1.00	Wetness	1.00
		Clay content	0.35	Clay content	0.35
VoC:					
Voladora-----	90	Somewhat limited		Somewhat limited	
		Clay content	0.79	Clay content	0.79
		Slope	0.63	Water gathering	0.13
		Water gathering	0.13	Slope	0.04
VoD:					
Voladora-----	90	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Clay content	0.79	Clay content	0.79
		Cutbanks cave	0.01	Cutbanks cave	0.01
W:					
Water-----	100	Not rated		Not rated	

Table 20.--Engineering Soil Properties

[Absence of an entry indicates that the data were not estimated]

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
AbF:												
Agüeybaná-----	0-14	Clay, clay loam	CH	A-7	0	0	100	100	97-98	91-94	47-74	24-43
	14-44	Clay, clay loam, silty clay	CH	A-7	0	0	100	100	97-99	90-95	45-70	25-43
	44-60	Silty clay, clay loam, clay	CH	A-7	0	0	100	100	95-99	86-90	43-62	24-39
	60-74	Clay loam, clay	CL	A-6	0	0	100	100	90-97	76-80	35-57	18-36
AgD:												
Aguilita-----	0-6	Silty clay loam, clay loam	CH	A-7-6	0	0	70-100	60-100	50-100	50-95	50-53	27-29
	6-23	Clay loam, silty clay loam	CL, SC	A-6, A-4	0	0	65-100	55-100	50-100	40-85	28-32	9-13
	23-60	Loam, clay loam	CL	A-6, A-4	0	0	80-100	65-100	50-100	40-85	21-45	4-21
AgF:												
Aguilita-----	0-6	Silty clay loam, clay loam	CH	A-7-6	0	0	70-100	60-100	50-100	50-95	50-53	27-29
	6-23	Clay loam, silty clay loam	CL, SC	A-6, A-4	0	0	65-100	55-100	50-100	40-85	28-32	9-13
	23-60	Loam, clay loam	CL	A-6, A-4	0	0	80-100	65-100	50-100	40-85	21-45	4-21
AkA:												
Aguirre-----	0-18	Clay	CH	A-7-6	0	0	100	100	90-100	75-95	69-102	42-48
	18-80	Clay	CH	A-7-6	0	0	100	100	90-100	75-95	65-96	43-48
AlF:												
Aljibe-----	0-5	Mucky peat	PT	A-8	0	0	100	100	100	100	---	---
	5-16	Clay	MH	A-7-5, A-7-6	0	0	100	100	90-100	75-95	50-78	28-35
	16-31	Clay	MH	A-7-5, A-7-6	0	0	100	100	85-100	70-95	50-78	28-35
	31-35	Silty clay loam, clay loam	MH	A-7-5, A-7-6	0	0	100	100	85-100	70-95	41-68	21-26
	35-47	Weathered bedrock	GP	---	---	---	---	---	---	---	---	---
	47-80	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Guamá-----	0-4	Mucky peat	PT	A-8	0	0	100	100	100	100	---	---
	4-13	Clay	CL, MH, ML	A-7-5, A-7-6	0	0	100	100	90-100	75-95	43-68	18-32
	13-39	Clay	CH, CL, MH, ML	A-7-5, A-7-6	0	0	100	100	85-100	70-95	43-68	18-32
	39-61	Clay, clay loam, silty clay loam	CH, CL, MH, ML	A-7-5, A-7-6	0	0	100	100	85-100	70-95	43-68	18-32
	61-82	Clay, silty clay loam, clay loam	CL	A-6, A-7-6	0	0	100	100	95-100	85-95	36-47	14-20

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
AlF: Indiera-----	0-3	Mucky peat	PT	A-8	0	0	100	100	100	100	---	---
	3-8	Clay	MH	A-7-5, A-7-6	0	0	100	100	90-100	75-95	50-82	28-38
	8-22	Clay	MH	A-7-5, A-7-6	0	0	100	100	85-100	70-95	67-92	43-48
	22-47	Clay, clay loam	MH	A-7-5, A-7-6	0	0	100	100	85-100	70-95	45-74	25-31
	47-82	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	>82	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
AtD: Altamira-----	0-8	Very gravelly clay, very gravelly loam, very gravelly clay loam	CH	A-7-6	0	0-5	44-91	25-91	16-86	14-76	39-70	17-39
	8-14	Very gravelly clay, very gravelly loam, very gravelly clay loam, very gravelly silty clay loam, very gravelly silt loam	CL, SC	A-6	0	0	43-90	24-90	16-86	13-77	32-62	13-36
	14-43	Very gravelly clay loam, very gravelly loam, very gravelly silt loam	CL	A-6	0	0	48-100	21-100	16-94	12-78	27-47	10-25
	43-54	Gravelly loam, gravelly clay loam, gravelly silt loam	CL	A-6	0	0	68-100	44-100	38-100	26-81	30-60	11-28
	54-79	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
AtF: Altamira-----	0-8	Very gravelly clay, very gravelly loam, very gravelly clay loam	CH	A-7-6	0	0-5	44-91	25-91	16-86	14-76	39-70	17-39
	8-14	Very gravelly clay, very gravelly loam, very gravelly clay loam, very gravelly silty clay loam, very gravelly silt loam	CL, SC	A-6	0	0	43-90	24-90	16-86	13-77	32-62	13-36
	14-43	Very gravelly clay loam, very gravelly loam, very gravelly silt loam	CL	A-6	0	0	48-100	21-100	16-94	12-78	27-47	10-25
	43-54	Gravelly loam, gravelly clay loam, gravelly silt loam	CL	A-6	0	0	68-100	44-100	38-100	26-81	30-60	11-28
	54-79	Weathered bedrock	---	---	---	---	---	---	---	---	---	---

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
BaB: Bahía-----	0-6	Fine sand	SM, SP-SM	A-2, A-3	0	0	100	100	75-85	5-20	0-21	NP-3
	6-45	Loamy sand, sand	SC, SC-SM, SP-SC	A-2	0	0	100	100	75-90	10-20	16-27	2-8
	45-66	Fine sandy loam	SC-SM	A-2	0	0	100	100	80-90	20-30	25-31	10-12
BhB: Bahía Salinas---	0-6	Sand	SP-SM	A-2	0	0-14	79-100	79-100	59-78	6-10	0-18	NP-1
	6-28	Sand	SP-SM	A-2	0	0-14	79-100	79-100	58-79	5-12	0-19	NP-2
BjA: Bajura-----	0-4	Clay	CH	A-7-6	0	0	100	100	81-100	72-92	66-76	41-49
	4-16	Clay	CH	A-7-6	0	0	100	100	76-100	70-90	60-76	36-49
	16-42	Clay	CH	A-7-6	0	0	100	100	70-100	66-86	60-76	36-49
	42-80	Clay	CH	A-7-6	0	0	100	100	72-100	68-88	60-76	36-49
BkB: Beaches.												
BmC: Bermeja-----	0-2	Extremely cobbly sandy loam, extremely cobbly loam, extremely cobbly sandy clay loam, extremely cobbly sandy clay	GC	A-1	0	40-67	42-76	42-76	21-61	11-42	23-51	6-29
	2-8	Extremely paragravelly sandy clay loam, extremely paragravelly loam, extremely paragravelly clay loam	GC	A-2	0	18-34	22-56	22-56	10-37	8-30	26-46	10-25
	8-27	Extremely paragravelly clay, weathered bedrock	---	---	---	---	---	---	---	---	---	---
	27-35	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Cerro Mariquita-	0-2	Gravelly clay loam, gravelly clay	CH	A-7	0	3-9	25-69	22-68	21-68	15-60	41-62	21-36
	2-13	Extremely paragravelly clay, paracobbly clay	GC	A-2	0	18-34	27-56	27-56	25-56	23-56	57-73	36-47
	13-23	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	23-35	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
BmD: Bermeja-----	0-2	Extremely cobbly sandy loam, extremely cobbly loam, extremely cobbly sandy clay loam, extremely cobbly sandy clay	GC	A-1	0	40-67	42-76	42-76	21-61	11-42	23-51	6-29
	2-8	Extremely paragravelly sandy clay loam, extremely paragravelly loam, extremely paragravelly clay loam	GC	A-2	0	18-34	22-56	22-56	10-37	8-30	26-46	10-25
	8-27	Extremely paragravelly clay, weathered bedrock	---	---	---	---	---	---	---	---	---	---
	27-35	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Cerro Mariquita-	0-2	Gravelly clay loam, gravelly clay	CH	A-7	0	3-9	25-69	22-68	21-68	15-60	41-62	21-36
	2-13	Extremely paragravelly clay, paracobbly clay	GC	A-2	0	18-34	27-56	27-56	25-56	23-56	57-73	36-47
	13-23	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	23-35	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
BmF: Bermeja-----	0-2	Extremely cobbly sandy loam, extremely cobbly loam, extremely cobbly sandy clay loam, extremely cobbly sandy clay	GC	A-1	0	40-67	42-76	42-76	21-61	11-42	23-51	6-29
	2-8	Extremely paragravelly sandy clay loam, extremely paragravelly loam, extremely paragravelly clay loam	GC	A-2	0	18-34	22-56	22-56	10-37	8-30	26-46	10-25
	8-27	Extremely paragravelly clay, weathered bedrock	---	---	---	---	---	---	---	---	---	---
	27-35	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Cerro Mariquita-	0-2	Gravelly clay loam, gravelly clay	CH	A-7	0	3-9	25-69	22-68	21-68	15-60	41-62	21-36
	2-13	Extremely paragravelly clay, paracobbly clay	GC	A-2	0	18-34	27-56	27-56	25-56	23-56	57-73	36-47
	13-23	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	23-35	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
BrF: Bermeja-----	0-2	Extremely cobbly sandy loam, extremely cobbly loam, extremely cobbly sandy clay loam, extremely cobbly sandy clay	GC	A-1	0	40-67	42-76	42-76	21-61	11-42	23-51	6-29
	2-8	Extremely paragravelly sandy clay loam, extremely paragravelly loam, extremely paragravelly clay loam	GC	A-2	0	18-34	22-56	22-56	10-37	8-30	26-46	10-25
	8-27	Extremely paragravelly clay, weathered bedrock	---	---	---	---	---	---	---	---	---	---
	27-35	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Rock outcrop.												
CaC: Cabo Rojo-----	0-2	Clay	CH, MH	A-7-5, A-7-6	0	0	100	85-95	75-95	65-90	52-70	23-33
	2-26	Clay	CH, MH	A-7-5, A-7-6	0	0	100	100	90-100	75-95	52-70	23-33
	26-36	Clay loam	CH, MH	A-7-5, A-7-6	0	0	100	100	90-100	75-95	52-70	23-33
	36-72	Silty clay loam	CH, MH	A-7-5, A-7-6	0	0	100	100	90-100	75-95	52-70	23-33
CbD: Caguabo-----	0-6	Clay loam, loam, gravelly clay loam, gravelly loam	CH	A-7-6	0	0	70-90	50-90	40-85	30-50	45-65	15-31
	6-13	Paragravelly silty clay loam, silty clay loam, very paragravelly silty clay loam, extremely paragravelly silty clay loam	CH	A-7-6	0	0	55-100	50-75	45-75	30-60	30-50	10-30
	13-19	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	>19	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
CbF: Caguabo-----	0-6	Clay loam, loam, gravelly clay loam, gravelly loam	CH	A-7-6	0	0	70-90	50-90	40-85	30-50	45-65	15-31
	6-13	Paragravelly silty clay loam, silty clay loam, very paragravelly silty clay loam, extremely paragravelly silty clay loam	CH	A-7-6	0	0	55-100	50-75	45-75	30-60	30-50	10-30
	13-19 >19	Weathered bedrock Bedrock	---	---	---	---	---	---	---	---	---	---
CeA: Cartagena-----	0-7	Clay, clay loam	CH	A-7-6	0	0	100	100	90-100	90-95	47-86	22-45
	7-15	Clay, clay loam, silty clay	CH	A-7-6	0	0	100	100	90-100	90-95	47-86	22-45
	15-46	Clay, silty clay	CH	A-7-6	0	0	100	100	90-100	90-95	53-83	29-46
	46-60	Clay	CH	A-7-6	0	0	90-100	90-100	90-100	85-90	66-76	41-49
CgD: Casabe-----	0-7	Clay	CH	A-7	0	0-5	100	100	88-100	71-83	55-80	28-42
	7-16	Clay, gravelly clay	CH	A-7	0	0-5	100	100	85-100	69-94	52-74	28-43
	16-38	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	>38	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
CgF: Casabe-----	0-7	Clay	CH	A-7	0	0-5	100	100	88-100	71-83	55-80	28-42
	7-16	Clay, gravelly clay	CH	A-7	0	0-5	100	100	85-100	69-94	52-74	28-43
	16-38	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	>38	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
ChA: Cataño-----	0-8	Sand	SP-SM, SM	A-3, A-2	0	0	100	100	76-78	7-15	0-23	NP-1
	8-11	Coarse sand	SP-SM, SM	A-3, A-2	0	0	100	100	74-77	6-15	0-18	NP-1
	11-72	Coarse sand, gravelly coarse sand	SP-SM, SM	A-3, A-2	0	0	100	100	75-78	6-15	0-18	NP-1
CjD: Cerro Gordo-----	0-3	Mucky peat	PT	A-8	0	0	100	100	100	100	---	---
	3-11	Clay	CL, MH, ML	A-7-5, A-7-6	0	0	80-100	70-100	60-100	50-95	43-68	18-32
	11-81	Gravelly sandy clay loam	CH, CL, MH, ML	A-7-5, A-7-6	0	0	80-100	70-100	50-100	30-95	43-68	18-32

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
CkD: Cerro Mariquita-	0-2	Gravelly clay loam, gravelly clay	CH	A-7	0	3-9	25-69	22-68	21-68	15-60	41-62	21-36
	2-13	Extremely paragravelly clay, paracobbly clay	GC	A-2	0	18-34	27-56	27-56	25-56	23-56	57-73	36-47
	13-23	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	23-35	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
CkF: Cerro Mariquita-	0-2	Gravelly clay loam, gravelly clay	CH	A-7	0	3-9	25-69	22-68	21-68	15-60	41-62	21-36
	2-13	Extremely paragravelly clay, paracobbly clay	GC	A-2	0	18-34	27-56	27-56	25-56	23-56	57-73	36-47
	13-23	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	23-35	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
CmB: Coamo-----	0-9	Clay loam	CL	A-7-6	0	0	100	100	90-100	70-80	41-48	20-25
	9-23	Clay loam, clay	CH, CL	A-7-6	0	0	100	100	90-100	75-95	40-64	32-37
	23-50	Sandy clay loam, clay loam, clay	SC	A-7-6	0	0	80-90	70-80	50-70	40-50	52-59	28-34
	50-80	Gravelly sandy clay loam, clay loam, sandy loam	GC, GC-GM, SC, SC-SM	A-2	0	0	60-70	40-50	30-45	25-35	21-30	4-11
CoA: Coloso-----	0-11	Clay	CH	A-7-6	0	0	100	100	100	90-100	66-90	41-55
	11-31	Clay, clay loam	CH	A-7-6	0	0	100	100	100	90-100	60-90	36-50
	31-90	Clay, clay loam	CH	A-7-6	0	0	100	100	100	90-100	60-95	36-70
CsE: Consumo-----	0-5	Clay, clay loam	CH, CL, MH, ML	A-7-6	0	0	100	100	95-100	85-95	43-52	18-23
	5-20	Clay, silty clay	MH	A-7-5	0	0	100	100	90-100	85-95	56-64	26-30
	20-80	Silty clay loam, clay loam, loam	CL	A-6, A-7-6	0	0	100	100	95-100	85-95	34-47	13-20
CsF: Consumo-----	0-5	Clay, clay loam	CH, CL, MH, ML	A-7-6	0	0	100	100	95-100	85-95	43-52	18-23
	5-20	Clay, silty clay	MH	A-7-5	0	0	100	100	90-100	85-95	56-64	26-30
	20-80	Silty clay loam, clay loam, loam	CL	A-6, A-7-6	0	0	100	100	95-100	85-95	34-47	13-20

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
CtA: Cortada-----	0-6	Silty clay loam, silt loam, loam	CL	A-7	0	0	100	100	79-100	70-98	29-62	5-26
	6-15	Silty clay loam, silt loam, loam	CL	A-7	0	0	100	100	68-96	58-86	29-62	5-26
	15-23	Silty clay loam, clay loam, sandy clay loam	CL	A-7	0	0	100	100	94-100	83-91	41-54	20-26
	23-34	Clay loam, silty clay loam, sandy clay loam	CL	A-7	0	0	75-100	74-100	64-94	50-77	41-54	20-26
	34-45	Sandy clay loam, clay loam, silty clay loam	CL	A-7	0	0	75-100	74-100	64-95	41-63	41-54	20-26
	45-56	Sandy loam, silt loam, silty clay loam, loam	CL	A-6	0	0	75-100	74-100	54-98	33-70	21-47	6-24
	56-63	Loam, silt loam, silty clay loam, sandy loam	CL	A-6	0	0	75-100	74-100	59-100	40-79	21-47	6-24
	63-80	Sandy clay loam	CL	A-6	0	0	75-100	74-100	57-90	33-58	30-46	13-23
CuD: Costa-----	0-7	Very gravelly clay, very gravelly clay loam	CH	A-7	1-3	10-20	50-70	50-65	40-60	40-50	41-80	20-42
	7-11	Gravelly clay, gravelly clay loam	CH	A-7	0	0	75-100	65-85	65-85	50-75	39-71	20-46
	11-19	Clay loam, silty clay, clay	CL	A-7	0	0	90-100	90-100	90-100	80-100	37-64	21-43
	19-43	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	43-63	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Pitahaya-----	0-2	Gravelly clay, gravelly clay loam	CH	A-7	0	0-5	70-100	70-100	50-100	50-75	46-80	24-42
	2-11	Extremely gravelly clay, extremely gravelly clay loam	CH	A-7	0	0	20-50	15-50	15-50	15-50	44-69	24-43
	11-27	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	27-80	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
CuF: Costa-----	0-7	Very gravelly clay, very gravelly clay loam	CH	A-7	1-3	10-20	50-70	50-65	40-60	40-50	41-80	20-42
	7-11	Gravelly clay, gravelly clay loam	CH	A-7	0	0	75-100	65-85	65-85	50-75	39-71	20-46
	11-19	Clay loam, silty clay, clay	CL	A-7	0	0	90-100	90-100	90-100	80-100	37-64	21-43
	19-43	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	43-63	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
CuF: Pitahaya-----	0-2	Gravelly clay, gravelly clay loam	CH	A-7	0	0-5	70-100	70-100	50-100	50-75	46-80	24-42
	2-11	Extremely gravelly clay, extremely gravelly clay loam	CH	A-7	0	0	20-50	15-50	15-50	15-50	44-69	24-43
	11-27	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	27-80	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
CvF: Cuchillas-----	0-6	Silty clay loam	CL	A-7-6	0	0	75-95	73-95	67-95	62-93	46-66	18-27
	6-15	Silty clay loam, silty clay, gravelly silty clay loam, gravelly silty clay	CL	A-7-6, A-6	0	0	65-80	61-78	59-78	53-78	39-73	19-42
	15-36	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	>36	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
CvG: Cuchillas-----	0-6	Silty clay loam	CL	A-7-6	0	0	75-95	73-95	67-95	62-93	46-66	18-27
	6-15	Silty clay loam, silty clay, gravelly silty clay loam, gravelly silty clay	CL	A-7-6, A-6	0	0	65-80	61-78	59-78	53-78	39-73	19-42
	15-36	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	>36	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
DeD: Delicias-----	0-6	Clay, gravelly clay	CH, CL, MH, ML	A-7-5, A-7-6	0	0	80-90	70-85	60-80	50-80	43-70	18-33
	6-68	Clay, gravelly clay	CH, CL, MH, ML	A-7-5, A-7-6	0	0	80-90	70-85	60-80	50-80	43-70	18-33
DqA: Dique-----	0-12	Loam	CL	A-4, A-6	0	0	100	100	85-100	60-90	28-36	9-16
	12-37	Loam, silt loam	CL	A-4, A-6	0	0	100	100	85-100	60-90	28-36	9-20
	37-90	Loam, clay, silty clay loam, silty clay, sandy clay loam	CL	A-4, A-6	0	0	100	100	85-100	60-90	28-36	9-20

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
DSC: Descalabrado----	0-5	Clay, clay loam, gravelly clay, gravelly clay loam, cobbly clay, cobbly clay loam	CH	A-7	0	0	90-100	70-100	60-100	60-80	50-56	28-33
	5-10	Clay, clay loam, gravelly clay, gravelly clay loam, cobbly clay, cobbly clay loam	CH, SC	A-7	0	0	85-100	50-75	45-75	35-70	50-68	28-43
	10-18	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	>18	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
DSD: Descalabrado----	0-5	Clay, clay loam, gravelly clay, gravelly clay loam, cobbly clay, cobbly clay loam	CH	A-7	0	0	90-100	70-100	60-100	60-80	50-56	28-33
	5-10	Clay, clay loam, gravelly clay, gravelly clay loam, cobbly clay, cobbly clay loam	CH, SC	A-7	0	0	85-100	50-75	45-75	35-70	50-68	28-43
	10-18	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	>18	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
DSF: Descalabrado----	0-5	Clay, clay loam, gravelly clay, gravelly clay loam, cobbly clay, cobbly clay loam	CH	A-7	0	0	90-100	70-100	60-100	60-80	50-56	28-33
	5-10	Clay, clay loam, gravelly clay, gravelly clay loam, cobbly clay, cobbly clay loam	CH, SC	A-7	0	0	85-100	50-75	45-75	35-70	50-68	28-43
	10-18	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	>18	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
EcD: El Cacique-----	0-6	Gravelly clay loam, gravelly clay	CH, CL	A-7-6	0	0-5	100	100	88-100	71-83	44-64	19-27
	6-11	Very paragravelly clay, very paragravelly clay loam	CH	A-7-6	0	0-5	100	100	85-100	69-94	47-72	24-43
	11-14	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	14-86	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
EcD: La Taína-----	0-8	Very gravelly clay, very gravelly clay loam	CH	A-7-6	0	0	25-86	22-85	17-85	14-76	50-80	24-42
	8-17	Extremely gravelly clay, extremely paragravelly clay, extremely gravelly clay loam, extremely paragravelly clay loam	GC	A-2	0-1	0-10	13-30	10-27	8-27	6-23	47-72	24-43
	17-29	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	>29	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
EcF: El Cacique-----	0-6	Gravelly clay loam, gravelly clay	CH, CL	A-7-6	0	0-5	100	100	88-100	71-83	44-64	19-27
	6-11	Very paragravelly clay, very paragravelly clay loam	CH	A-7-6	0	0-5	100	100	85-100	69-94	47-72	24-43
	11-14	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	14-86	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
La Taína-----	0-8	Very gravelly clay, very gravelly clay loam	CH	A-7-6	0	0	25-86	22-85	17-85	14-76	50-80	24-42
	8-17	Extremely gravelly clay, extremely paragravelly clay, extremely gravelly clay loam, extremely paragravelly clay loam	GC	A-2	0-1	0-10	13-30	10-27	8-27	6-23	47-72	24-43
	17-29	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	>29	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
EcG: El Cacique-----	0-6	Gravelly clay loam, gravelly clay	CH, CL	A-7-6	0	0-5	100	100	88-100	71-83	44-64	19-27
	6-11	Very paragravelly clay, very paragravelly clay loam	CH	A-7-6	0	0-5	100	100	85-100	69-94	47-72	24-43
	11-14	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	14-86	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
EcG: La Taína-----	0-8	Very gravelly clay, very gravelly clay loam	CH	A-7-6	0	0	25-86	22-85	17-85	14-76	50-80	24-42
	8-17	Extremely gravelly clay, extremely paragravelly clay, extremely gravelly clay loam, extremely paragravelly clay loam	GC	A-2	0-1	0-10	13-30	10-27	8-27	6-23	47-72	24-43
	17-29	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	>29	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
EdD: El Descanso-----	0-3	Mucky peat	PT	A-8	0	0-5	100	100	100	100	---	---
	3-8	Very gravelly clay loam, clay loam	GC	A-7-6	0	0	35-78	32-78	27-77	23-68	47-79	21-31
	8-15	Extremely paragravelly clay, clay			0	0	100	100	84-99	73-88	47-79	24-43
	15-80	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Hoconuco-----	0-3	Mucky peat	PT	A-8	7-40	7-40	100	100	100	100	---	---
	3-7	Gravelly clay loam, clay	GM	A-7-6	0	5-52	36-95	34-95	25-90	22-79	46-71	20-34
	7-14	Paragravelly clay	CH	A-7	6-44	0	100	100	77-92	67-82	50-82	28-49
	14-37	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	37-80	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
EdF: El Descanso-----	0-3	Mucky peat	PT	A-8	0	0-5	100	100	100	100	---	---
	3-8	Very gravelly clay loam, clay loam	GC	A-7-6	0	0	35-78	32-78	27-77	23-68	47-79	21-31
	8-15	Extremely paragravelly clay, clay			0	0	100	100	84-99	73-88	47-79	24-43
	15-80	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Hoconuco-----	0-3	Mucky peat	PT	A-8	7-40	7-40	100	100	100	100	---	---
	3-7	Gravelly clay loam, clay	GM	A-7-6	0	5-52	36-95	34-95	25-90	22-79	46-71	20-34
	7-14	Paragravelly clay	CH	A-7	6-44	0	100	100	77-92	67-82	50-82	28-49
	14-37	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	37-80	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
EdG: El Descanso-----	0-3	Mucky peat	PT	A-8	0	0-5	100	100	100	100	---	---
	3-8	Very gravelly clay loam, clay loam	GC	A-7-6	0	0	35-78	32-78	27-77	23-68	47-79	21-31
	8-15	Extremely paragravelly clay, clay			0	0	100	100	84-99	73-88	47-79	24-43
	15-80	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Hoconuco-----	0-3	Mucky peat	PT	A-8	7-40	7-40	100	100	100	100	---	---
	3-7	Gravelly clay loam, clay	GM	A-7-6	0	5-52	36-95	34-95	25-90	22-79	46-71	20-34
	7-14	Paragravelly clay	CH	A-7	6-44	0	100	100	77-92	67-82	50-82	28-49
	14-37	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	37-80	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
EpC: El Papayo-----	0-2	Gravelly clay loam, very gravelly clay loam, clay loam	CH	A-7	0	0-1	46-83	44-82	38-81	32-69	43-59	20-29
	2-14	Clay, clay loam	CH, SC	A-7	0	0	91-100	82-100	59-100	48-88	43-72	21-44
	14-16	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	>16	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
EpD: El Papayo-----	0-2	Gravelly clay loam, very gravelly clay loam, clay loam	CH	A-7	0	0-1	46-83	44-82	38-81	32-69	43-59	20-29
	2-14	Clay, clay loam	CH, SC	A-7	0	0	91-100	82-100	59-100	48-88	43-72	21-44
	14-16	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	>16	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
EpF: El Papayo-----	0-2	Gravelly clay loam, very gravelly clay loam, clay loam	CH	A-7	0	0-1	46-83	44-82	38-81	32-69	43-59	20-29
	2-14	Clay, clay loam	CH, SC	A-7	0	0	91-100	82-100	59-100	48-88	43-72	21-44
	14-16	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	>16	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
FeA: Fé-----	0-7	Clay	CH	A-7	0	0	95-100	90-100	90-100	75-95	60-66	36-41
	7-17	Clay	CH	A-7	0	0	95-100	90-100	90-100	75-95	60-70	36-44
	17-42	Clay	CH	A-7	0	0	95-100	95-100	90-100	75-95	66-70	41-44
	42-56	Clay	CH	A-7	0	0	95-100	85-100	80-100	70-95	66-70	41-44

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
FrA: Fraternidad-----	0-13	Clay	CH	A-7	0	0	85-100	75-100	65-100	60-95	46-79	28-49
	13-17	Clay	CH	A-7	0	0	85-100	75-100	65-100	60-95	46-78	28-51
	17-65	Clay	CH	A-7	0	0	85-100	75-100	65-100	60-95	46-79	28-52
FrB: Fraternidad-----	0-13	Clay	CH	A-7	0	0	85-100	75-100	65-100	60-95	46-79	28-49
	13-17	Clay	CH	A-7	0	0	85-100	75-100	65-100	60-95	46-78	28-51
	17-65	Clay	CH	A-7	0	0	85-100	75-100	65-100	60-95	46-79	28-52
GbF: Guanábano-----	0-2	Clay	CH, CL	A-7-6	0-1	5-20	75-95	70-90	60-85	55-75	48-57	25-32
	2-6	Clay	CH	A-7-6	0	0-5	75-95	70-90	60-85	55-74	57-66	32-39
	6-13	Clay	CL	A-7-6	0	0-5	75-95	70-90	60-85	55-76	43-48	21-25
	13-21	Gravelly clay	CL	A-7-6	0	0-10	75-95	70-90	60-85	55-76	41-44	20-22
	21-80	Very gravelly silty clay loam, gravel, gravelly silty clay loam, extremely cobbly clay loam	GC	A-2, A-6, A- 7-6	0-5	10-20	40-60	35-55	35-55	30-50	39-44	18-22
GhC: Guanajibo-----	0-10	Gravelly sandy clay loam, gravelly loam, sandy clay loam, loam	CL, SC	A-6, A-4	0	0	90-100	70-100	60-95	30-75	25-30	8-11
	10-21	Clay, clay loam	MH	A-6	0	0	90-100	80-100	80-95	70-90	29-38	10-15
	21-63	Clay, clay loam	MH	A-6	0	0	90-100	90-100	90-95	70-90	30-38	11-15
GnA: Guánica-----	0-4	Clay	CH	A-7	0	0	100	100	85-100	80-100	85-105	30-65
	4-12	Clay	CH	A-7	0	0	100	100	85-100	80-100	85-100	30-65
	12-52	Clay	CH	A-7	0	0	100	100	85-100	80-100	85-100	30-65
	52-79	Clay	CH	A-7	0	0	100	100	85-100	80-100	85-100	30-65
GuB: Guayabo-----	0-7	Fine sand	SP-SM	A-2-4, A-3	0	0-1	79-100	78-100	73-94	6-11	0-20	NP
	7-55	Sand, fine sand	SP-SM	A-2-4, A-3	0	0-1	79-100	78-100	73-94	6-11	0-20	NP
	55-65	Fine sand, loamy sand	SM	A-2-4	0	0-1	80-100	80-100	63-94	8-25	0-20	NP
	65-75	Loamy sand, fine sand	SM	A-2-4	0	0-1	80-100	80-100	63-84	16-25	0-20	NP

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
GyB: Guayacán-----	0-8	Clay, clay loam, loam	CH	A-6, A-7	0	0	90-100	79-100	54-100	39-90	33-80	13-42
	8-12	Clay, loam, clay loam	CH	A-6, A-7	0	0	84-100	60-100	38-100	30-89	31-69	13-43
	12-26	Clay, loam, clay loam	CH	A-6, A-7	0	0	84-100	60-100	38-100	30-89	31-69	13-43
	26-45	Gravelly clay loam, gravelly clay, gravelly loam	CL	A-4, A-6	0	0	78-90	58-90	37-90	26-77	20-56	6-36
	45-59	Loam, clay loam, silt loam	CL	A-4, A-6	0	0	64-100	27-100	15-90	10-73	16-48	2-28
	59-76	Very gravelly silt, very gravelly clay loam, very gravelly loam	ML	A-4, A-6	0	0	46-100	30-100	27-100	25-100	16-48	2-28
	76-91	Gravelly clay loam, gravelly loam, gravelly silt loam	CL	A-4, A-6	0	0	56-100	24-100	13-91	9-74	16-48	2-28
GyC: Guayacán-----	0-8	Clay, clay loam, loam	CH	A-6, A-7	0	0	90-100	79-100	54-100	39-90	33-80	13-42
	8-12	Clay, loam, clay loam	CH	A-6, A-7	0	0	84-100	60-100	38-100	30-89	31-69	13-43
	12-26	Clay, loam, clay loam	CH	A-6, A-7	0	0	84-100	60-100	38-100	30-89	31-69	13-43
	26-45	Gravelly clay loam, gravelly clay, gravelly loam	CL	A-4, A-6	0	0	78-90	58-90	37-90	26-77	20-56	6-36
	45-59	Loam, clay loam, silt loam	CL	A-4, A-6	0	0	64-100	27-100	15-90	10-73	16-48	2-28
	59-76	Very gravelly silt, very gravelly clay loam, very gravelly loam	ML	A-4, A-6	0	0	46-100	30-100	27-100	25-100	16-48	2-28
	76-91	Gravelly clay loam, gravelly loam, gravelly silt loam	CL	A-4, A-6	0	0	56-100	24-100	13-91	9-74	16-48	2-28

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
GyD: Guayacán-----	0-8	Clay, clay loam, loam	CH	A-6, A-7	0	0	90-100	79-100	54-100	39-90	33-80	13-42
	8-12	Clay, loam, clay loam	CH	A-6, A-7	0	0	84-100	60-100	38-100	30-89	31-69	13-43
	12-26	Clay, loam, clay loam	CH	A-6, A-7	0	0	84-100	60-100	38-100	30-89	31-69	13-43
	26-45	Gravelly clay loam, gravelly clay, gravelly loam	CL	A-4, A-6	0	0	78-90	58-90	37-90	26-77	20-56	6-36
	45-59	Loam, clay loam, silt loam	CL	A-4, A-6	0	0	64-100	27-100	15-90	10-73	16-48	2-28
	59-76	Very gravelly silt, very gravelly clay loam, very gravelly loam	ML	A-4, A-6	0	0	46-100	30-100	27-100	25-100	16-48	2-28
	76-91	Gravelly clay loam, gravelly loam, gravelly silt loam	CL	A-4, A-6	0	0	56-100	24-100	13-91	9-74	16-48	2-28
HmD: Humatas-----	0-5	Clay	MH	A-7-5, A-7-6	0	0	100	90-100	90-100	80-95	52-65	20-30
	5-32	Clay, silty clay	MH	A-7-5	0	0	100	100	90-100	85-95	61-72	28-36
	32-44	Clay	MH	A-7-5	0	0	100	100	95-100	85-95	52-75	20-40
	44-65	Silty clay loam, silty clay, clay	CL	A-6, A-7-6	0	0	100	100	95-100	80-95	36-75	14-25
HmE: Humatas-----	0-5	Clay	MH	A-7-5, A-7-6	0	0	100	90-100	90-100	80-95	52-65	20-30
	5-32	Clay, silty clay	MH	A-7-5	0	0	100	100	90-100	85-95	61-72	28-36
	32-44	Clay	MH	A-7-5	0	0	100	100	95-100	85-95	52-75	20-40
	44-65	Silty clay loam, silty clay, clay	CL	A-6, A-7-6	0	0	100	100	95-100	80-95	36-75	14-25
HmF: Humatas-----	0-5	Clay	MH	A-7-5, A-7-6	0	0	100	90-100	90-100	80-95	52-65	20-30
	5-32	Clay, silty clay	MH	A-7-5	0	0	100	100	90-100	85-95	61-72	28-36
	32-44	Clay	MH	A-7-5	0	0	100	100	95-100	85-95	52-75	20-40
	44-65	Silty clay loam, silty clay, clay	CL	A-6, A-7-6	0	0	100	100	95-100	80-95	36-75	14-25
JaB: Jácana-----	0-20	Clay	CH	A-7-6	0	0	100	100	90-100	75-95	52-57	28-32
	20-30	Clay	CH	A-7-6	0	0	100	100	90-100	75-95	52-66	28-39
	30-33	Clay loam, sandy clay loam	CL, SC	A-6, A-7-6	0	0	100	100	70-80	40-60	35-43	15-21
	>33	Weathered bedrock	---	---	---	---	---	---	---	---	---	---

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
JaC:												
Jácana-----	0-20	Clay	CH	A-7-6	0	0	100	100	90-100	75-95	52-57	28-32
	20-30	Clay	CH	A-7-6	0	0	100	100	90-100	75-95	52-66	28-39
	30-33	Clay loam, sandy clay loam	CL, SC	A-6, A-7-6	0	0	100	100	70-80	40-60	35-43	15-21
	>33	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
JBA:												
Joyuda-----	0-4	Muck, mucky peat	PT	A-8	0	0	100	100	100	100	---	---
	4-80	Mucky peat, muck	PT	A-8	0	0	100	100	100	100	---	---
Atolladero-----	0-2	Mucky loam	OH	A-8	0	0	100	100	79-94	57-72	---	5-16
	2-32	Loamy sand, sandy loam	SM	A-2	0	0	100	100	76-91	17-32	25-48	2-13
	32-60	Loamy sand	SM	A-2	0	0	100	100	73-85	19-31	0-32	NP-7
Bajura-----	0-4	Clay	CH	A-7-6	0	0	100	100	81-100	72-92	66-76	41-49
	4-16	Clay	CH	A-7-6	0	0	100	100	76-100	70-90	60-76	36-49
	16-42	Clay	CH	A-7-6	0	0	100	100	70-100	66-86	60-76	36-49
	42-80	Clay	CH	A-7-6	0	0	100	100	72-100	68-88	60-76	36-49
LcE:												
La Covana-----	0-5	Gravelly clay, gravelly silty clay loam, gravelly clay loam, gravelly silty clay	GC-GM	A-7	0	0	75-100	70-90	65-90	60-75	43-86	21-46
	5-19	Extremely gravelly clay, extremely gravelly silty clay loam, extremely gravelly clay loam, extremely gravelly silty clay	GC-GM	A-2-7	0	0	20-30	0-25	0-25	0-25	43-74	21-43
	19-31	Cemented	---	---	---	---	---	---	---	---	---	---
	31-80	Silt loam, silty clay loam	ML	A-7	0	0	80-100	70-100	60-80	50-75	19-47	2-25
Limestone rock outcrop.												

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
LcE: Seboruco-----	0-2	Silty clay loam, silt loam	CL	A-7	0	0	84-100	84-100	67-100	60-97	29-56	9-28
	2-7	Silty clay loam, silty clay	CL	A-7	0	0	48-92	46-91	42-91	38-91	42-64	20-35
	7-11	Very gravelly silty clay loam, very gravelly silty clay	GC	A-7	0	0	47-92	45-91	38-91	34-87	42-64	20-35
	11-19	Gravelly silt loam, gravelly silty clay loam, gravelly silty clay	CL	A-6	0	0	59-92	57-91	49-91	42-91	27-60	9-36
	19-26	Silt loam, silty clay loam, silty clay	CL	A-6	0	0	59-92	57-91	49-91	42-91	27-60	9-36
	26-31 >31	Loam, silt loam Unweathered bedrock	CL ---	A-6 ---	0 ---	0 ---	59-100 ---	57-100 ---	43-96 ---	31-75 ---	23-43 ---	6-21 ---
LdA: La Luna-----	0-11	Silty clay loam, clay loam, silty clay	CL	A-6, A-7-6	0	0	100	100	95-100	85-95	35-43	15-21
	11-20	Silty clay loam, clay loam, silty clay	CL	A-6, A-7-6	0	0	100	100	95-100	85-95	35-43	15-21
	20-58	Silty clay loam, clay loam, silty clay	CL	A-6	0	0	100	100	90-100	70-90	30-36	11-15
	58-75	Silty clay loam, sandy clay loam, clay loam	CL	A-6, A-7-6	0	0	100	100	95-100	85-95	35-43	15-21
LeF: La Tea-----	0-5	Very cobbly clay	CH	A-7	0-2	25-29	67-88	66-88	58-87	57-87	71-92	42-53
	5-11	Gravelly clay	GC	A-7	0	0	48-96	48-96	43-96	42-96	67-85	43-54
	11-16	Paragravelly clay	CH	A-7	0	0	50-100	50-100	50-100	50-100	67-85	43-54
	16-18 18-40	Weathered bedrock Unweathered bedrock	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---
LfC: Landfill.												
LkB: Lares-----	0-2	Clay	CH	A-7-5	0	0	100	95-100	95-100	80-95	55-60	20-28
	2-5	Clay	CH, CL, MH, ML	A-7-5, A-7-6	0	0	95-100	95-100	90-100	75-95	47-56	20-25
	5-28	Clay	MH	A-7-5	0	0	95-100	95-100	90-100	75-95	56-66	25-33
	28-43	Clay	MH	A-7-5, A-7-6	0	0	95-100	90-100	80-100	65-95	52-61	23-28
	43-83	Clay, clay loam	CH, MH	A-7-5, A-7-6	0	0	85-100	85-100	75-95	60-80	50-59	22-27

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
LnA: Llanos Costa----	0-9	Loam, clay loam, clay	ML	A-4	0	0	73-100	73-100	56-96	45-75	31-66	10-36
	9-15	Gravelly clay loam, gravelly clay	CL	A-7	0	0	35-75	35-75	27-75	21-70	40-64	21-36
	15-43	Gravelly clay, very gravelly clay, gravelly clay loam, very gravelly clay loam	GC	A-7	0	0	60-100	50-75	45-75	35-70	40-60	21-36
	43-78	Very gravelly sandy clay loam, gravelly sandy clay loam, very gravelly clay loam, gravelly clay loam	GC	A-2-6	0	0	50-75	50-75	11-65	8-40	38-50	19-29
LnB: Llanos Costa----	0-9	Loam, clay loam, clay	ML	A-4	0	0	73-100	73-100	56-96	45-75	31-66	10-36
	9-15	Gravelly clay loam, gravelly clay	CL	A-7	0	0	35-75	35-75	27-75	21-70	40-64	21-36
	15-43	Gravelly clay, very gravelly clay, gravelly clay loam, very gravelly clay loam	GC	A-7	0	0	60-100	50-75	45-75	35-70	40-60	21-36
	43-78	Very gravelly sandy clay loam, gravelly sandy clay loam, very gravelly clay loam, gravelly clay loam	GC	A-2-6	0	0	50-75	50-75	11-65	8-40	38-50	19-29
LnC: Llanos Costa----	0-9	Loam, clay loam, clay	ML	A-4	0	0	73-100	73-100	56-96	45-75	31-66	10-36
	9-15	Gravelly clay loam, gravelly clay	CL	A-7	0	0	35-75	35-75	27-75	21-70	40-64	21-36
	15-43	Gravelly clay, very gravelly clay, gravelly clay loam, very gravelly clay loam	GC	A-7	0	0	60-100	50-75	45-75	35-70	40-60	21-36
	43-78	Very gravelly sandy clay loam, gravelly sandy clay loam, very gravelly clay loam, gravelly clay loam	GC	A-2-6	0	0	50-75	50-75	11-65	8-40	38-50	19-29
LpG: Los Penones-----	0-8	Mucky peat	PT	A-8	0	0	100	100	100	100	---	---
	>8	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
LpG: Limestone rock outcrop.												
MaB: Mabí-----	0-7	Clay	CH	A-7-6	0	0	100	90-100	85-100	70-95	70-76	44-49
	7-50	Clay	CH	A-7-6	0	0	100	90-100	85-100	70-95	70-76	44-49
	50-74	Clay	CH	A-7-6	0	0	100	90-100	85-100	70-95	70-76	44-49
MbA: Maguayo-----	0-6	Very gravelly sandy clay loam, sandy loam, clay loam	GC, CL, SC	A-2-6, A-2-7	0	0	75-100	60-100	40-90	25-70	39-44	10-21
	6-12	Very gravelly coarse sandy loam, sandy clay loam, sandy loam, clay loam	GC, CL, SC	A-2-6, A-2-7	0	0	75-100	60-100	30-90	25-70	35-57	10-32
	12-35	Clay, clay loam	CH	A-7-6	0	0	90-100	85-100	70-90	60-70	41-70	20-50
	35-65	Clay, clay loam	CH	A-7-6	0	0-2	90-100	85-100	70-90	60-70	37-70	16-50
MbC: Maguayo-----	0-6	Very gravelly sandy clay loam, sandy loam, clay loam	GC, CL, SC	A-2-6, A-2-7	0	0	75-100	60-100	40-90	25-70	39-44	10-21
	6-12	Very gravelly coarse sandy loam, sandy clay loam, sandy loam, clay loam	GC, CL, SC	A-2-6, A-2-7	0	0	75-100	60-100	30-90	25-70	35-57	10-32
	12-35	Clay, clay loam	CH	A-7-6	0	0	90-100	85-100	70-90	60-70	41-70	20-50
	35-65	Clay, clay loam	CH	A-7-6	0	0-2	90-100	85-100	70-90	60-70	37-70	16-50
McF: Malaya-----	0-4	Clay	CH, CL	A-7-6	0	0	100	100	90-100	75-95	48-66	25-39
	4-10	Gravelly clay, gravelly clay loam, clay loam	CL	A-7, A-6, A- 2-7, A-7-6	0	0	85-100	77-100	70-100	30-95	37-43	16-21
	10-72	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
MDA: Manglillo-----	0-5	Muck	PT	A-8	0	0	100	100	100	100	---	---
	5-24	Mucky peat	PT	A-8	0	0	100	100	100	100	---	---
	24-43	Mucky loam	CH	A-7	0	0	100	100	79-94	57-72	31-62	6-17
	43-60	Sandy loam	SM	A-7	0	0	75-85	74-84	49-71	27-46	0-57	NP-12

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
MDA: Boquerón-----	0-2	Muck	PT	A-8	0	0	100	100	100	100	---	---
	2-4	Silty clay, silty clay loam	CH	A-7-6	0	0	100	100	84-100	81-100	43-64	22-38
	4-8	Mucky clay loam, silty clay, clay loam	CH	A-7-6	0	0	100	100	88-100	74-99	49-80	21-39
	8-55	Silty clay, clay	CH	A-7-6	0	0	100	100	84-100	81-100	50-64	25-38
	55-79	Clay, silty clay	CH	A-7-6	0	0	100	100	79-100	76-100	50-64	25-38
Serrano-----	0-3	Sandy loam	SC, SC-SM	A-2-4, A-2-6	0	0	90-95	85-90	50-65	25-35	23-30	6-11
	3-14	Loam, sandy clay loam	SC	A-2-6, A-2-7, A-6, A-7-6	0	0	90-95	85-90	70-80	30-50	30-43	11-21
	14-65	Very gravelly loam, extremely gravelly loamy sand	SC, SC-SM	A-1-b, A-2-4	0	0	90-95	85-90	40-70	15-25	21-26	4-8
MeA: Maní-----	0-13	Clay	CH, CL	A-7-6	0	0	100	100	90-100	75-95	48-64	25-35
	13-41	Clay	CH, CL	A-7-6	0	0	100	100	90-100	75-95	48-64	25-37
	41-90	Clay	CH	A-7-6	0	0	100	100	99-100	96-100	52-70	28-39
MfF: Maresúa-----	0-1	Gravelly mucky peat	PT	A-8	0	0	80-100	80-100	70-100	60-70	---	---
	1-4	Gravelly clay loam, gravelly silty clay loam, clay loam, silty clay loam	GC, GP-GC	A-2-6	0	0	80-100	70-100	15-100	11-50	30-40	15-25
	4-10	Extremely paragravelly clay loam, extremely gravelly silty clay loam, gravelly clay loam, gravelly silty clay loam	GC, GP-GC	A-2-6	0	0	50-100	20-100	15-50	11-25	30-40	15-25
	10-26	Extremely paragravelly clay, extremely paragravelly clay loam, extremely paragravelly silty clay loam, extremely paragravelly silty clay	GC, GP-GC	A-2-6	0	0	50-100	20-100	15-50	11-25	30-70	15-40
	26-46	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	>46	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
MgF: Maresúa-----	0-1	Gravelly mucky peat	PT	A-8	0	0	80-100	80-100	70-100	60-70	---	---
	1-4	Gravelly clay loam, gravelly silty clay loam, clay loam, silty clay loam	GC, GP-GC	A-2-6	0	0	80-100	70-100	15-100	11-50	30-40	15-25
	4-10	Extremely paragravelly clay loam, extremely gravelly silty clay loam, gravelly clay loam, gravelly silty clay loam	GC, GP-GC	A-2-6	0	0	50-100	20-100	15-50	11-25	30-40	15-25
	10-26	Extremely paragravelly clay, extremely paragravelly clay loam, extremely paragravelly silty clay loam, extremely paragravelly silty clay	GC, GP-GC	A-2-6	0	0	50-100	20-100	15-50	11-25	30-70	15-40
	26-46	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	>46	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Serpentinite rock outcrop.												
Mid: Mariana-----	0-8	Gravelly clay loam, gravelly clay, clay loam, clay	CH, GC, SC	A-7, A-7-6	0	0	50-85	50-75	45-75	35-70	50-55	25-30
	8-15	Gravelly clay loam, gravelly clay, clay loam, clay	CH, GC, SC	A-7, A-7-6	0	0	50-85	50-80	45-75	35-70	50-55	25-30
	15-32	Clay, clay loam	CH, CL	A-7, A-7-6	0	0	90-100	85-100	75-100	65-95	45-55	25-30
	32-49	Silty clay, clay loam, silty clay loam	CL	A-7	0	0	90-100	90-100	90-100	80-95	45-65	25-30
	49-59	Silty clay, clay loam, silty clay loam	CL	A-7	0	0	90-100	90-100	90-100	90-100	45-65	25-30

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
MiE: Mariana-----	0-8	Gravelly clay loam, gravelly clay, clay loam, clay	CH, GC, SC	A-7, A-7-6	0	0	50-85	50-75	45-75	35-70	50-55	25-30
	8-15	Gravelly clay loam, gravelly clay, clay loam, clay	CH, GC, SC	A-7, A-7-6	0	0	50-85	50-80	45-75	35-70	50-55	25-30
	15-32	Clay, clay loam	CH, CL	A-7, A-7-6	0	0	90-100	85-100	75-100	65-95	45-55	25-30
	32-49	Silty clay, clay loam, silty clay loam	CL	A-7	0	0	90-100	90-100	90-100	80-95	45-65	25-30
	49-59	Silty clay, clay loam, silty clay loam	CL	A-7	0	0	90-100	90-100	90-100	90-100	45-65	25-30
MkF: Maricao-----	0-5	Clay, clay loam	MH	A-7-5	0	5-7	100	100	100	90-100	61-65	28-30
	5-11	Clay, clay loam	MH	A-7-5	0	0	100	100	100	90-100	61-65	28-30
	11-29	Clay	MH	A-7-5	0	0	100	100	90-100	90-100	61-65	28-30
	29-46	Clay, silty clay	ML, CL, CH, MH	A-6, A-7-6	0	0	100	100	90-100	85-100	34-52	13-23
	46-63	Clay loam, clay	CH, CL, MH, ML	A-7-6	0	0	100	100	90-100	80-100	34-52	13-23
MkG: Maricao-----	0-5	Clay, clay loam	MH	A-7-5	0	5-7	100	100	100	90-100	61-65	28-30
	5-11	Clay, clay loam	MH	A-7-5	0	0	100	100	100	90-100	61-65	28-30
	11-29	Clay	MH	A-7-5	0	0	100	100	90-100	90-100	61-65	28-30
	29-46	Clay, silty clay	ML, CL, CH, MH	A-6, A-7-6	0	0	100	100	90-100	85-100	34-52	13-23
	46-63	Clay loam, clay	CH, CL, MH, ML	A-7-6	0	0	100	100	90-100	80-100	34-52	13-23
MnA: Melones-----	0-7	Clay, clay loam	CH	A-7	0	0	82-100	82-100	64-100	50-86	47-74	24-43
	7-18	Clay, clay loam	CH	A-7	0	0	82-100	82-100	65-100	50-87	49-74	25-44
	18-46	Clay, clay loam	CH	A-7	0	0	75-100	74-100	59-100	43-83	46-72	25-44
	46-66	Clay, gravelly clay, gravelly clay loam, clay loam, gravelly sandy clay, sandy clay	CH	A-7	0	0	55-100	53-100	41-100	31-84	46-72	25-44
	66-70	Gravelly sandy clay, gravelly clay, gravelly clay loam, clay loam, clay, sandy clay	CH	A-7	0	0	75-100	70-100	55-100	35-76	46-72	25-44
	70-79	Clay, clay loam	CH	A-7	0	0	75-100	74-100	63-100	48-89	46-72	25-44

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
MnC: Melones-----	0-7	Clay, clay loam	CH	A-7	0	0	82-100	82-100	64-100	50-86	47-74	24-43
	7-18	Clay, clay loam	CH	A-7	0	0	82-100	82-100	65-100	50-87	49-74	25-44
	18-46	Clay, clay loam	CH	A-7	0	0	75-100	74-100	59-100	43-83	46-72	25-44
	46-66	Clay, gravelly clay, gravelly clay loam, clay loam, gravelly sandy clay, sandy clay	CH	A-7	0	0	55-100	53-100	41-100	31-84	46-72	25-44
	66-70	Gravelly sandy clay, gravelly clay, gravelly clay loam, clay loam, clay, sandy clay	CH	A-7	0	0	75-100	70-100	55-100	35-76	46-72	25-44
	70-79	Clay, clay loam	CH	A-7	0	0	75-100	74-100	63-100	48-89	46-72	25-44
MoB: Montalva-----	0-6	Clay, clay loam	CH	A-7-6	0	0	67-100	66-100	50-96	42-83	49-72	25-40
	6-16	Clay	CH	A-7-6	0	0	67-100	66-100	57-96	48-83	56-68	32-40
	16-29	Clay	CH	A-7-6	0	0	67-100	66-100	57-96	48-83	56-68	32-40
	29-32	Sandy clay loam, clay loam, sandy clay	CL	A-6, A-7-6	0	0	100	100	83-98	50-65	40-56	21-32
	32-40	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
MoC: Montalva-----	0-6	Clay, clay loam	CH	A-7-6	0	0	67-100	66-100	50-96	42-83	49-72	25-40
	6-16	Clay	CH	A-7-6	0	0	67-100	66-100	57-96	48-83	56-68	32-40
	16-29	Clay	CH	A-7-6	0	0	67-100	66-100	57-96	48-83	56-68	32-40
	29-32	Sandy clay loam, clay loam, sandy clay	CL	A-6, A-7-6	0	0	100	100	83-98	50-65	40-56	21-32
	32-40	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
MqC: Monte grande-----	0-6	Clay	CH	A-7-6	0	0	100	100	90-100	75-95	62-90	36-49
	6-10	Clay	CH	A-7-6	0	0	100	100	90-100	75-95	62-90	36-49
	10-24	Clay	CH	A-7-6	0	0	100	100	90-100	75-95	61-93	37-57
	24-65	Gravelly clay, very gravelly clay, extremely gravelly clay	GC	A-2-7	0	0	40-50	25-35	20-35	20-30	50-96	29-61
MrD: Morado-----	0-5	Clay loam, clay	CL	A-6, A-7	0	0	100	100	90-100	70-80	37-43	16-21
	5-16	Clay, clay loam	CL	A-6, A-7	0	0	100	100	90-100	70-80	37-43	16-21
	16-21	Clay loam	CL, CL-ML	A-4, A-6	0	0	100	100	85-95	60-75	23-30	6-11
	21-31	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	31-80	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
MrE: Morado-----	0-5	Clay loam, clay	CL	A-6, A-7	0	0	100	100	90-100	70-80	37-43	16-21
	5-16	Clay, clay loam	CL	A-6, A-7	0	0	100	100	90-100	70-80	37-43	16-21
	16-21	Clay loam	CL, CL-ML	A-4, A-6	0	0	100	100	85-95	60-75	23-30	6-11
	21-31	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	31-80	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
MrF: Morado-----	0-5	Clay loam, clay	CL	A-6, A-7	0	0	100	100	90-100	70-80	37-43	16-21
	5-16	Clay, clay loam	CL	A-6, A-7	0	0	100	100	90-100	70-80	37-43	16-21
	16-21	Clay loam	CL, CL-ML	A-4, A-6	0	0	100	100	85-95	60-75	23-30	6-11
	21-31	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	31-80	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
MuC: Múcara-----	0-5	Loam, silty clay loam, silty clay, clay	CH	A-7-6	0	0	90-100	90-100	85-100	60-90	40-56	25-33
	5-18	Loam, fine sandy loam, silty clay loam, silty clay, clay	CH	A-7-6	0	0	90-100	90-100	80-100	50-90	40-56	33-46
	18-32	Gravelly sandy loam, silty clay loam	CH	A-7-6	0	0	90-100	80-100	50-100	30-90	56-72	33-46
	>32	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
MuD: Múcara-----	0-5	Loam, silty clay loam, silty clay, clay	CH	A-7-6	0	0	90-100	90-100	85-100	60-90	40-56	25-33
	5-18	Loam, fine sandy loam, silty clay loam, silty clay, clay	CH	A-7-6	0	0	90-100	90-100	80-100	50-90	40-56	33-46
	18-32	Gravelly sandy loam, silty clay loam	CH	A-7-6	0	0	90-100	80-100	50-100	30-90	56-72	33-46
	>32	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
MuE: Múcara-----	0-5	Loam, silty clay loam, silty clay, clay	CH	A-7-6	0	0	90-100	90-100	85-100	60-90	40-56	25-33
	5-18	Loam, fine sandy loam, silty clay loam, silty clay, clay	CH	A-7-6	0	0	90-100	90-100	80-100	50-90	40-56	33-46
	18-32	Gravelly sandy loam, silty clay loam	CH	A-7-6	0	0	90-100	80-100	50-100	30-90	56-72	33-46
	>32	Weathered bedrock	---	---	---	---	---	---	---	---	---	---

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
MuF: Múcara-----	0-5	Loam, silty clay loam, silty clay, clay	CH	A-7-6	0	0	90-100	90-100	85-100	60-90	40-56	25-33
	5-18	Loam, fine sandy loam, silty clay loam, silty clay, clay	CH	A-7-6	0	0	90-100	90-100	80-100	50-90	40-56	33-46
	18-32	Gravelly sandy loam, silty clay loam	CH	A-7-6	0	0	90-100	80-100	50-100	30-90	56-72	33-46
	>32	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
NpD: Nipe-----	0-2	Mucky peat	PT	A-8	0	0	100	100	100	100	---	---
	2-7	Clay	CH, CL, MH, ML	A-7-5, A-7-6	0	0	95-100	95-100	90-100	75-95	43-68	18-32
	7-11	Clay	CH, CL, MH, ML	A-7-5, A-7-6	0	0	95-100	90-100	85-100	70-95	43-68	18-32
	11-60	Clay	CH, CL, MH, ML	A-7-5, A-7-6	0	0	100	95-100	85-100	75-95	43-70	15-33
OrA: Olivares-----	0-2	Mucky peat	PT	A-8	0	0	100	100	100	100	---	---
	2-25	Silty clay	CH	A-7	0	0	100	100	99-100	96-100	56-78	28-39
	25-48	Silty clay	CH	A-7	0	0	100	100	99-100	96-100	52-70	28-39
	48-80	Silty clay	CH	A-7	0	0	100	100	99-100	96-100	50-66	28-40
PaA: Palmarejo-----	0-9	Loam, clay loam	CL	A-4	0	0	95-100	95-100	85-95	60-75	25-29	8-10
	9-30	Clay, silty clay, silty clay loam, clay loam	CH, CL, MH, ML	A-7-6	0	0	95-100	95-100	85-95	70-95	47-52	20-23
	30-41	Clay loam, sandy clay loam	CL	A-6, A-7-6	0	0	95-100	90-100	75-90	55-85	34-45	13-19
	41-51	Sandy clay loam, clay loam	CL, SC	A-6, A-7-6	0	0	95-100	90-100	65-85	40-80	31-43	11-18
PaB: Palmarejo-----	0-9	Loam, clay loam	CL	A-4	0	0	95-100	95-100	85-95	60-75	25-29	8-10
	9-30	Clay, silty clay, silty clay loam, clay loam	CH, CL, MH, ML	A-7-6	0	0	95-100	95-100	85-95	70-95	47-52	20-23
	30-41	Clay loam, sandy clay loam	CL	A-6, A-7-6	0	0	95-100	90-100	75-90	55-85	34-45	13-19
	41-51	Sandy clay loam, clay loam	CL, SC	A-6, A-7-6	0	0	95-100	90-100	65-85	40-80	31-43	11-18

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
PaC: Palmarejo-----	0-9	Loam, clay loam	CL	A-4	0	0	95-100	95-100	85-95	60-75	25-29	8-10
	9-30	Clay, silty clay, silty clay loam, clay loam	CH, CL, MH, ML	A-7-6	0	0	95-100	95-100	85-95	70-95	47-52	20-23
	30-41	Clay loam, sandy clay loam	CL	A-6, A-7-6	0	0	95-100	90-100	75-90	55-85	34-45	13-19
	41-51	Sandy clay loam, clay loam	CL, SC	A-6, A-7-6	0	0	95-100	90-100	65-85	40-80	31-43	11-18
PgA: Parguera-----	0-7	Clay, clay loam	CH	A-7	0	0	85-100	75-100	65-100	60-95	66-76	41-49
	7-22	Clay, clay loam	CH	A-7	0	0	85-100	75-100	65-100	60-95	70-76	44-49
	22-39	Extremely gravelly clay, clay loam	GC, CH, SC	A-2-7	0	0	20-100	10-100	10-100	10-95	66-76	41-49
	39-57	Extremely gravelly coarse sandy loam, sandy clay loam	GC	A-2-7	0	0	20-100	20-100	10-100	10-95	66-76	41-49
	57-79	Clay	CH	A-7	0	0	85-100	85-100	65-100	65-95	55-65	35-43
PgB: Parguera-----	0-7	Clay, clay loam	CH	A-7	0	0	85-100	75-100	65-100	60-95	66-76	41-49
	7-22	Clay, clay loam	CH	A-7	0	0	85-100	75-100	65-100	60-95	70-76	44-49
	22-39	Extremely gravelly clay, clay loam	GC, CH, SC	A-2-7	0	0	20-100	10-100	10-100	10-95	66-76	41-49
	39-57	Extremely gravelly coarse sandy loam, sandy clay loam	GC	A-2-7	0	0	20-100	20-100	10-100	10-95	66-76	41-49
	57-79	Clay	CH	A-7	0	0	85-100	85-100	65-100	65-95	55-65	35-43
PsF: Pitahaya-----	0-2	Gravelly clay, gravelly clay loam	CH	A-7	0	0-5	70-100	70-100	50-100	50-75	46-80	24-42
	2-11	Extremely gravelly clay, extremely gravelly clay loam	CH	A-7	0	0	20-50	15-50	15-50	15-50	44-69	24-43
	11-27	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	27-80	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Limestone rock outcrop.												

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
PsF: Seboruco-----	0-2	Silty clay loam, silt loam	CL	A-7	0	0	84-100	84-100	67-100	60-97	29-56	9-28
	2-7	Silty clay loam, silty clay	CL	A-7	0	0	48-92	46-91	42-91	38-91	42-64	20-35
	7-11	Very gravelly silty clay loam, very gravelly silty clay	GC	A-7	0	0	47-92	45-91	38-91	34-87	42-64	20-35
	11-19	Gravelly silt loam, gravelly silty clay loam, gravelly silty clay	CL	A-6	0	0	59-92	57-91	49-91	42-91	27-60	9-36
	19-26	Silt loam, silty clay loam, silty clay	CL	A-6	0	0	59-92	57-91	49-91	42-91	27-60	9-36
	26-31	Loam, silt loam	CL	A-6	0	0	59-100	57-100	43-96	31-75	23-43	6-21
	>31	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
PsG: Pitahaya-----	0-2	Gravelly clay, gravelly clay loam	CH	A-7	0	0-5	70-100	70-100	50-100	50-75	46-80	24-42
	2-11	Extremely gravelly clay, extremely gravelly clay loam	CH	A-7	0	0	20-50	15-50	15-50	15-50	44-69	24-43
	11-27	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	27-80	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Limestone rock outcrop.												
Seboruco-----	0-2	Silty clay loam, silt loam	CL	A-7	0	0	84-100	84-100	67-100	60-97	29-56	9-28
	2-7	Silty clay loam, silty clay	CL	A-7	0	0	48-92	46-91	42-91	38-91	42-64	20-35
	7-11	Very gravelly silty clay loam, very gravelly silty clay	GC	A-7	0	0	47-92	45-91	38-91	34-87	42-64	20-35
	11-19	Gravelly silt loam, gravelly silty clay loam, gravelly silty clay	CL	A-6	0	0	59-92	57-91	49-91	42-91	27-60	9-36
	19-26	Silt loam, silty clay loam, silty clay	CL	A-6	0	0	59-92	57-91	49-91	42-91	27-60	9-36
	26-31	Loam, silt loam	CL	A-6	0	0	59-100	57-100	43-96	31-75	23-43	6-21
	>31	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
Pt: Pits and quarries.												
PzB: Pozo Blanco-----	0-7	Clay	CL, GC, SC	A-6, A-7	90-100	0	60-100	60-100	50-100	30-50	37-43	16-22
	7-22	Clay, clay loam	CL, GC, SC	A-6, A-7	90-100	0	60-100	60-100	50-100	30-50	30-43	11-22
	22-30	Gravelly clay loam, clay, silty clay loam, clay loam, gravelly clay, gravelly silty clay loam	CH	A-6, A-7	0	0	80-100	80-100	60-100	50-80	31-69	13-43
	30-60	Gravelly loam, loam, very gravelly loam, sandy loam, gravelly sandy loam, very gravelly sandy loam, silty clay loam, gravelly silty clay loam, very gravelly silty clay loam	CL	A-4, A-6	0	0	90-100	90-100	60-100	50-80	28-32	9-13
PzC: Pozo Blanco-----	0-7	Clay	CL, GC, SC	A-6, A-7	90-100	0	60-100	60-100	50-100	30-50	37-43	16-22
	7-22	Clay, clay loam	CL, GC, SC	A-6, A-7	90-100	0	60-100	60-100	50-100	30-50	30-43	11-22
	22-30	Gravelly clay loam, clay, silty clay loam, clay loam, gravelly clay, gravelly silty clay loam	CH	A-6, A-7	0	0	80-100	80-100	60-100	50-80	31-69	13-43
	30-60	Gravelly loam, very gravelly loam, loam, sandy loam, gravelly sandy loam, very gravelly sandy loam, silty clay loam, gravelly silty clay loam, very gravelly silty clay loam	CL	A-4, A-6	0	0	90-100	90-100	60-100	50-80	28-32	9-13

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10						
					inches	inches	4	10	40	200		
	In				Pct	Pct					Pct	
PzD: Pozo Blanco-----	0-7	Clay	CL, GC, SC	A-6, A-7	90-100	0	60-100	60-100	50-100	30-50	37-43	16-22
	7-22	Clay, clay loam	CL, GC, SC	A-6, A-7	90-100	0	60-100	60-100	50-100	30-50	30-43	11-22
	22-30	Gravelly clay loam, clay, silty clay loam, clay loam, gravelly clay, gravelly silty clay loam	CH	A-6, A-7	0	0	80-100	80-100	60-100	50-80	31-69	13-43
	30-60	Gravelly loam, loam, very gravelly loam, sandy loam, gravelly sandy loam, very gravelly sandy loam, silty clay loam, gravelly silty clay loam, very gravelly silty clay loam	CL	A-4, A-6	0	0	90-100	90-100	60-100	50-80	28-32	9-13
QbD: Quebrada-----	0-2	Clay loam, sandy loam, silty clay loam, clay	CL	A-7-6	0	0	100	100	95-100	90-95	48-65	25-38
	2-19	Clay, silty clay, clay loam	CL	A-7-6	0	0	100	100	90-100	75-95	48-65	25-38
	19-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
QbE: Quebrada-----	0-2	Clay loam, sandy loam, silty clay loam, clay	CL	A-7-6	0	0	100	100	95-100	90-95	48-65	25-38
	2-19	Clay, silty clay, clay loam	CL	A-7-6	0	0	100	100	90-100	75-95	48-65	25-38
	19-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
QbF: Quebrada-----	0-2	Clay loam, sandy loam, silty clay loam, clay	CL	A-7-6	0	0	100	100	95-100	90-95	48-65	25-38
	2-19	Clay, silty clay, clay loam	CL	A-7-6	0	0	100	100	90-100	75-95	48-65	25-38
	19-60	Weathered bedrock	---	---	---	---	---	---	---	---	---	---

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
ReA: Reilly-----	0-4	Sandy loam, fine sandy loam, loam, silt loam	SM	A-2-4	0	0	60-78	55-60	40-55	35-45	0-14	NP
	4-17	Loamy sand, fine sandy loam	SP-SM, SP, GW, GP	A-1	0	0-10	25-67	10-50	5-35	1-10	0-35	NP
	17-75	Stratified extremely gravelly coarse sand to sand to loamy sand to extremely gravelly fine sandy loam	SP-SM, SP, GW, GP	A-1	0	5-10	20-55	10-50	5-35	0-8	0-14	NP
RoD: Rosario-----	0-2	Mucky peat	PT	A-8	0	0	100	100	100	100	---	---
	2-6	Silty clay, clay, clay loam	CH, CL, MH, ML	A-7-5, A-7-6	0	0	100	100	90-100	75-95	43-70	18-33
	6-32	Silty clay, clay, clay loam	CH, CL, MH, ML	A-7-5, A-7-6	0	0	100	100	85-100	75-95	43-70	18-33
	32-44	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	>44	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
RoE: Rosario-----	0-2	Mucky peat	PT	A-8	0	0	100	100	100	100	---	---
	2-6	Silty clay, clay, clay loam	CH, CL, MH, ML	A-7-5, A-7-6	0	0	100	100	90-100	75-95	43-70	18-33
	6-32	Silty clay, clay, clay loam	CH, CL, MH, ML	A-7-5, A-7-6	0	0	100	100	85-100	75-95	43-70	18-33
	32-44	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	>44	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
RoF: Rosario-----	0-2	Mucky peat	PT	A-8	0	0	100	100	100	100	---	---
	2-6	Silty clay, clay, clay loam	CH, CL, MH, ML	A-7-5, A-7-6	0	0	100	100	90-100	75-95	43-70	18-33
	6-32	Silty clay, clay, clay loam	CH, CL, MH, ML	A-7-5, A-7-6	0	0	100	100	85-100	75-95	43-70	18-33
	32-44	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	>44	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
RuF: Rubias-----	0-8	Clay loam	CL	A-7	0	0	46-95	45-95	37-90	31-76	42-56	19-27
	8-18	Clay loam	CL	A-7	0	0	46-95	45-95	37-88	31-74	43-56	21-27
	18-25	Loam	CL	A-6	0	0	100	100	78-96	57-75	22-39	6-19
	25-50	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	>50	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	<i>In</i>				<i>Pct</i>	<i>Pct</i>					<i>Pct</i>	
RuF: Chiquito-----	0-5	Gravelly clay loam, clay loam	CH	A-7-6	0	0	70-90	50-90	40-85	30-50	45-65	15-31
	5-18	Very gravelly clay loam, very paragravelly clay loam, extremely gravelly clay loam, extremely paragravelly clay loam	CH	A-7-6	0	0	55-100	50-75	45-75	30-60	30-50	10-30
	>18	Bedrock	---	---	---	---	---	---	---	---	---	---
RuG: Rubias-----	0-8	Clay loam	CL	A-7	0	0	46-95	45-95	37-90	31-76	42-56	19-27
	8-18	Clay loam	CL	A-7	0	0	46-95	45-95	37-88	31-74	43-56	21-27
	18-25	Loam	CL	A-6	0	0	100	100	78-96	57-75	22-39	6-19
	25-50	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	>50	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Chiquito-----	0-5	Gravelly clay loam, clay loam	CH	A-7-6	0	0	70-90	50-90	40-85	30-50	45-65	15-31
	5-18	Very gravelly clay loam, very paragravelly clay loam, extremely gravelly clay loam, extremely paragravelly clay loam	CH	A-7-6	0	0	55-100	50-75	45-75	30-60	30-50	10-30
	>18	Bedrock	---	---	---	---	---	---	---	---	---	---
Sa: Salt flats, ponded.												
Sb: Salt pits.												

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
ScA: San Anton-----	0-8	Clay loam, silty clay	CH, CL	A-7	0	0	90-100	85-100	75-100	60-85	42-55	19-32
	8-13	Clay loam, silty clay	CL	A-7	0	0	70-100	55-100	50-100	40-95	25-49	6-24
	13-24	Silty clay loam, loam, clay, sandy clay loam	CL, CL-ML	A-7, A-6	0	0	100	100	85-100	60-90	23-41	6-17
	24-31	Clay, loam, silty clay loam, sandy clay loam	CL, CL-ML	A-7, A-6	0	0	100	100	85-100	60-90	23-59	6-31
	31-41	Sandy clay loam, loam, clay, silty clay loam	CL, CL-ML	A-4, A-6	0	0	100	100	85-100	45-90	21-39	6-17
	41-54	Loam, silty clay loam, clay, sandy clay loam	CL, CL-ML	A-4, A-6	0	0	100	100	85-100	60-90	23-41	6-17
	54-70	Sandy clay loam, loam, clay, silty clay loam	CL, CL-ML	A-4, A-6	0	0	100	100	85-100	60-90	21-39	6-17
SdD: San Germán-----	0-4	Cobbly clay loam, cobbly clay, clay loam, clay	CL	A-2-7, A-2-6	0	3-31	47-89	35-86	31-86	23-73	40-64	20-35
	4-10	Extremely gravelly clay loam, extremely gravelly clay	GC	A-2-7, A-2-6	0	0	26-60	9-50	8-50	6-43	39-62	20-35
	10-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
SdF: San Germán-----	0-4	Cobbly clay loam, cobbly clay, clay loam, clay	CL	A-2-7, A-2-6	0	3-31	47-89	35-86	31-86	23-73	40-64	20-35
	4-10	Extremely gravelly clay loam, extremely gravelly clay	GC	A-2-7, A-2-6	0	0	26-60	9-50	8-50	6-43	39-62	20-35
	10-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
SgD: San Germán-----	0-4	Cobbly clay loam, cobbly clay, clay loam, clay	CL	A-2-7, A-2-6	0	3-31	47-89	35-86	31-86	23-73	40-64	20-35
	4-10	Extremely gravelly clay loam, extremely gravelly clay	GC	A-2-7, A-2-6	0	0	26-60	9-50	8-50	6-43	39-62	20-35
	10-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
SgD: Duey-----	0-13	Gravelly clay loam, gravelly clay, very gravelly clay, very gravelly clay loam	CL	A-2-7	0	0	30-84	27-83	23-83	19-77	41-64	20-35
	13-17	Extremely gravelly clay loam, extremely gravelly silty clay, extremely gravelly silty clay loam, extremely gravelly clay	CL	A-2-6, A-2-7	0	0	9-52	6-50	5-50	5-50	39-70	20-43
	17-35	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	35-80	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
SgF: San Germán-----	0-4	Cobbly clay loam, cobbly clay, clay loam, clay	CL	A-2-7, A-2-6	0	3-31	47-89	35-86	31-86	23-73	40-64	20-35
	4-10	Extremely gravelly clay loam, extremely gravelly clay	GC	A-2-7, A-2-6	0	0	26-60	9-50	8-50	6-43	39-62	20-35
	10-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Duey-----	0-13	Gravelly clay loam, gravelly clay, very gravelly clay, very gravelly clay loam	CL	A-2-7	0	0	30-84	27-83	23-83	19-77	41-64	20-35
	13-17	Extremely gravelly clay loam, extremely gravelly silty clay, extremely gravelly silty clay loam, extremely gravelly clay	CL	A-2-6, A-2-7	0	0	9-52	6-50	5-50	5-50	39-70	20-43
	17-35	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	35-80	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
SiA: Santa Isabel----	0-10	Clay, clay loam	CH	A-7	0	0	100	100	85-100	85-95	60-70	30-45
	10-63	Clay	CH	A-7	0	0	100	100	85-100	85-100	65-75	40-50
	63-69	Clay	CH	A-7	0	0	100	100	85-100	85-90	65-75	40-50

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
SmE: Santa Marta-----	0-8	Gravelly clay loam	CL	A-7-6	0	0	100	100	90-100	75-95	48-65	25-37
	8-21	Paragravelly clay	CL	A-7-6	0	0	80-100	70-100	50-100	40-95	48-65	25-37
	21-37	Extremely paragravelly clay	GC	A-2	0	0-5	40-50	25-35	15-25	8-20	48-68	27-42
	37-57	Weathered bedrock	---	---	---	---	---	---	---	---	---	---
	57-64	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
SoC: Seboruco-----	0-2	Silty clay loam, silt loam	CL	A-7	0	0	84-100	84-100	67-100	60-97	29-56	9-28
	2-7	Silty clay loam, silty clay	CL	A-7	0	0	48-92	46-91	42-91	38-91	42-64	20-35
	7-11	Very gravelly silty clay loam, very gravelly silty clay	GC	A-7	0	0	47-92	45-91	38-91	34-87	42-64	20-35
	11-19	Gravelly silt loam, gravelly silty clay loam, gravelly silty clay	CL	A-6	0	0	59-92	57-91	49-91	42-91	27-60	9-36
	19-26	Silt loam, silty clay loam, silty clay	CL	A-6	0	0	59-92	57-91	49-91	42-91	27-60	9-36
	26-31	Loam, silt loam	CL	A-6	0	0	59-100	57-100	43-96	31-75	23-43	6-21
	>31	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
SsB: Sosa-----	0-5	Sandy loam	SC-SM	A-2	0	0	95-100	79-100	68-85	17-28	24-33	7-12
	5-12	Sandy loam, gravelly sandy loam	SC-SM	A-2	0	0	83-100	80-100	64-75	17-28	24-33	7-12
	12-20	Sandy clay, sandy clay loam	CL, SC	A-7	0	0	85-100	79-100	55-90	25-52	35-56	17-32
	20-33	Sandy clay, clay	CL, SC	A-7	0	0	95-100	90-100	80-92	37-53	45-54	26-32
	33-63	Sandy clay loam, sandy clay, clay	SC	A-6	0	0	91-100	81-100	65-100	28-54	34-54	17-32
SsC: Sosa-----	0-5	Sandy loam	SC-SM	A-2	0	0	95-100	79-100	68-85	17-28	24-33	7-12
	5-12	Sandy loam, gravelly sandy loam	SC-SM	A-2	0	0	83-100	80-100	64-75	17-28	24-33	7-12
	12-20	Sandy clay, sandy clay loam	CL, SC	A-7	0	0	85-100	79-100	55-90	25-52	35-56	17-32
	20-33	Sandy clay, clay	CL, SC	A-7	0	0	95-100	90-100	80-92	37-53	45-54	26-32
	33-63	Sandy clay loam, sandy clay, clay	SC	A-6	0	0	91-100	81-100	65-100	28-54	34-54	17-32

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
TeA: Teresa-----	0-10	Clay	CH	A-7	0	0	100	100	89-100	86-98	66-81	40-48
	10-38	Clay	CH	A-7	0	0	100	98-100	91-100	87-97	62-74	40-48
	38-44	Clay	CH	A-7	0	0	100	98-100	90-100	86-96	62-74	40-48
	44-78	Clay	CH	A-7	0	0	100	98-100	88-98	84-94	58-69	36-44
	78-85	Clay	CH	A-7	0	0	100	98-100	89-99	84-94	58-69	36-44
TfA: Teresa, ponded--	0-10	Clay	CH	A-7	0	0	100	100	89-100	86-98	66-81	40-48
	10-38	Clay	CH	A-7	0	0	100	98-100	91-100	87-97	62-74	40-48
	38-44	Clay	CH	A-7	0	0	100	98-100	90-100	86-96	62-74	40-48
	44-78	Clay	CH	A-7	0	0	100	98-100	88-98	84-94	58-69	36-44
	78-85	Clay	CH	A-7	0	0	100	98-100	89-99	84-94	58-69	36-44
ToA: Toa-----	0-8	Clay loam, clay, silty clay loam	CL	A-6, A-7-6	0	0	100	100	95-100	70-95	37-48	16-25
	8-17	Silty clay loam, clay, clay loam, sandy clay loam	CL	A-6, A-7-6	0	0	100	100	95-100	70-95	37-48	16-25
	17-43	Silty clay loam, silty clay, clay loam, sandy clay	CH, CL	A-7-6	0	0	100	100	90-100	70-95	43-52	21-28
	43-64	Silty clay loam, sandy clay loam, clay loam, silty clay, clay	CH, CL	A-7-6	0	0	100	100	90-100	70-95	43-52	21-28
Ua: Urban land.												
UbB: Urban land.												
Bahía-----	0-6	Fine sand	SM, SP-SM	A-2, A-3	0	0	100	100	75-85	5-20	0-21	NP-3
	6-45	Loamy sand, sand	SC, SC-SM, SP-SC	A-2	0	0	100	100	75-90	10-20	16-27	2-8
	45-66	Fine sandy loam	SC-SM	A-2	0	0	100	100	80-90	20-30	25-31	10-12
UgB: Urban land.												
Guayabo-----	0-7	Sand	SP-SM	A-2-4, A-3	0	0-1	79-100	78-100	73-94	6-11	0-20	NP
	7-55	Sand, fine sand	SP-SM	A-2-4, A-3	0	0-1	79-100	78-100	73-94	6-11	0-20	NP
	55-65	Fine sand, loamy sand	SM	A-2-4	0	0-1	80-100	80-100	63-94	8-25	0-20	NP
	65-75	Loamy sand, fine sand	SM	A-2-4	0	0-1	80-100	80-100	63-84	16-25	0-20	NP

Table 20.--Engineering Soil Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	<i>In</i>				<i>Pct</i>	<i>Pct</i>					<i>Pct</i>	
UsC: Urban land.												
Sosa-----	0-5	Sandy loam	SC-SM	A-2	0	0	95-100	79-100	68-85	17-28	24-33	7-12
	5-12	Sandy loam, gravelly sandy loam	SC-SM	A-2	0	0	83-100	80-100	64-75	17-28	24-33	7-12
	12-20	Sandy clay, sandy clay loam	CL, SC	A-7	0	0	85-100	79-100	55-90	25-52	35-56	17-32
	20-33	Sandy clay, clay	CL, SC	A-7	0	0	95-100	90-100	80-92	37-53	45-54	26-32
	33-63	Sandy clay loam, sandy clay, clay	SC	A-6	0	0	91-100	81-100	65-100	28-54	34-54	17-32
VaA: Vayas-----	0-5	Silty clay loam, clay	CH	A-7	0	0	100	100	92-100	82-100	45-71	25-40
	5-12	Silty clay loam, clay loam, clay	CH, CL	A-7	0	0	100	100	90-100	84-100	45-67	19-40
	12-23	Silty clay loam, silty clay, clay	CH, CL	A-7	0	0	100	100	87-100	83-100	45-65	19-40
	23-62	Silty clay loam, silty clay, silt loam, loam	CH, CL	A-7	0	0	100	100	69-100	65-100	45-64	25-40
VoC: Voladora-----	0-2	Clay	MH	A-7-5	0	0	100	100	90-100	75-95	61-72	28-33
	2-15	Clay	MH, ML	A-7-5, A-7-6	0	0	100	100	95-100	90-95	45-65	18-30
	15-48	Clay	CL	A-6, A-7-6	0	0	100	100	90-100	70-80	34-43	13-25
	48-60	Clay	CL	A-6, A-7-6	0	0	100	100	90-100	70-80	34-43	13-25
VoD: Voladora-----	0-2	Clay	MH	A-7-5	0	0	100	100	90-100	75-95	61-72	28-33
	2-15	Clay	MH, ML	A-7-5, A-7-6	0	0	100	100	95-100	90-95	45-65	18-30
	15-48	Clay	CL	A-6, A-7-6	0	0	100	100	90-100	70-80	34-43	13-25
	48-60	Clay	CL	A-6, A-7-6	0	0	100	100	90-100	70-80	34-43	13-25
W: Water.												

Table 21.--Physical Soil Properties

[Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer. Absence of an entry indicates that data were not estimated]

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								Kw	Kf	T		
	In	Pct	g/cc	µm/sec	In/in	Pct	Pct					
AbF:												
Agüeybaná-----	0-14	35-60	1.09-1.21	1.00-10.00	0.15-0.17	3.0-6.0	2.0-4.0	.10	.10	5	4	86
	14-44	35-60	1.13-1.21	0.10-1.00	0.15-0.17	3.0-6.0	1.0-2.0	.10	.10			
	44-60	35-55	1.13-1.35	0.10-1.00	0.15-0.17	1.0-2.9	0.5-1.0	.10	.10			
	60-74	27-50	1.13-1.35	1.00-10.00	0.15-0.17	1.0-2.9	0.0-0.5	.10	.10			
AgD:												
Aguilita-----	0-6	30-45	1.30-1.40	1.00-10.00	0.12-0.18	3.0-6.0	5.0-10	.24	.24	3	4L	86
	6-23	28-40	1.20-1.30	1.00-10.00	0.08-0.15	3.0-6.0	0.5-4.0	.17	.24			
	23-60	8-30	1.10-1.20	1.00-10.00	0.08-0.15	3.0-6.0	0.5-2.0	.17	.24			
AgF:												
Aguilita-----	0-6	30-45	1.30-1.40	1.00-10.00	0.12-0.18	3.0-6.0	5.0-10	.24	.24	3	4L	86
	6-23	28-40	1.20-1.30	1.00-10.00	0.08-0.15	3.0-6.0	0.5-4.0	.17	.24			
	23-60	8-30	1.10-1.20	1.00-10.00	0.08-0.15	3.0-6.0	0.5-2.0	.17	.24			
AkA:												
Aguirre-----	0-18	60-68	0.95-1.35	0.01-0.10	0.38-0.51	9.0-27.0	3.0-5.0	.24	.24	5	4	86
	18-80	60-68	0.95-1.30	0.01-0.10	0.38-0.51	9.0-27.0	1.0-4.0	.24	.24			
AlF:												
Aljibe-----	0-5	0-0	0.62-0.75	42.00-337.00	0.15-0.20	---	40-70	---	---	3	4	86
	5-16	40-50	1.30-1.45	1.00-10.00	0.10-0.15	0.0-2.9	1.0-10	.02	.02			
	16-31	40-50	1.25-1.35	1.00-10.00	0.10-0.15	0.0-2.9	1.0-10	.02	.02			
	31-35	30-38	1.25-1.40	1.00-10.00	0.10-0.15	0.0-2.9	1.0-10	.02	.02			
	35-47	---	---	---	---	---	---	---	---			
	47-80	---	---	---	---	---	---	---	---			
Guamá-----	0-4	0-0	0.62-0.75	42.00-373.00	0.15-0.20	---	40-70	---	---	3	4	86
	4-13	50-65	1.30-1.45	1.00-10.00	0.10-0.15	3.0-5.9	1.0-10	.02	.02			
	13-39	65-70	1.25-1.35	1.00-10.00	0.10-0.15	3.0-5.9	1.0-10	.02	.02			
	39-61	38-70	1.25-1.40	1.00-10.00	0.10-0.15	3.0-5.9	1.0-10	.02	.02			
	61-82	38-55	1.00-1.20	1.00-10.00	0.10-0.15	0.0-2.9	0.5-1.0	.02	.02			
Indiera-----	0-3	0-0	0.45-1.00	42.00-337.00	0.15-0.20	---	40-70	---	---	3	4	86
	3-8	40-55	1.30-1.45	1.00-10.00	0.10-0.15	0.0-2.9	1.0-10	.02	.02			
	8-22	60-68	1.25-1.35	1.00-10.00	0.10-0.15	0.0-2.9	1.0-10	.02	.02			
	22-47	30-55	1.25-1.40	1.00-10.00	0.10-0.15	0.0-2.9	1.0-10	.02	.02			
	47-82	---	---	---	---	---	---	---	---			
	>82	---	---	---	---	---	---	---	---			

Table 21.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								Kw	Kf	T		
	In	Pct	g/cc	µm/sec	In/in	Pct	Pct					
AtD:												
Altamira-----	0-8	25-55	1.30-1.40	0.10-1.00	0.12-0.20	3.0-5.9	2.0-4.0	.24	.24	3	4L	86
	8-14	20-50	1.20-1.25	0.10-1.00	0.12-0.20	3.0-6.0	0.5-2.0	.17	.24			
	14-43	15-35	1.05-1.10	1.00-10.00	0.10-0.18	4.0-9.0	0.0-1.0	.28	.28			
	43-54	15-35	1.05-1.15	10.00-100.00	0.10-0.18	9.0-30.0	0.0-1.0	.32	.32			
	54-79	---	---	---	---	---	---	---	---			
AtF:												
Altamira-----	0-8	25-55	1.30-1.40	0.10-1.00	0.12-0.20	3.0-5.9	2.0-4.0	.24	.24	3	4L	86
	8-14	20-50	1.20-1.25	0.10-1.00	0.12-0.20	3.0-6.0	0.5-2.0	.17	.24			
	14-43	15-35	1.05-1.10	1.00-10.00	0.10-0.18	4.0-9.0	0.0-1.0	.28	.28			
	43-54	15-35	1.05-1.15	10.00-100.00	0.10-0.18	9.0-30.0	0.0-1.0	.32	.32			
	54-79	---	---	---	---	---	---	---	---			
BaB:												
Bahía-----	0-6	3-6	1.50-1.70	10.00-100.00	0.07-0.09	0.0-2.9	0.5-1.0	.02	.02	5	1	220
	6-45	5-13	1.50-1.65	10.00-100.00	0.09-0.11	0.0-2.9	0.0-1.0	.10	.10			
	45-66	16-18	1.50-1.65	10.00-100.00	0.14-0.16	0.0-2.9	0.0-1.0	.10	.10			
BhB:												
Bahía Salinas-----	0-6	0-3	1.55-1.60	141.00-282.00	0.03-0.05	0.0-2.9	0.5-1.0	.10	.10	5	1	220
	6-28	0-5	1.55-1.60	141.00-282.00	0.03-0.05	0.0-2.9	0.0-0.5	.10	.10			
BjA:												
Bajura-----	0-4	40-60	1.30-1.40	0.10-1.00	0.14-0.22	9.0-15.0	2.0-6.0	.24	.24	5	4	86
	4-16	40-60	1.30-1.40	0.01-0.10	0.12-0.18	9.0-15.0	0.3-6.0	.24	.24			
	16-42	40-60	1.30-1.40	0.01-0.10	0.12-0.18	9.0-15.0	0.2-1.0	.24	.24			
	42-80	40-60	1.30-1.35	0.01-0.10	0.12-0.18	9.0-15.0	0.2-0.5	.24	.24			
BkB:												
Beaches.												
BmC:												
Bermeja-----	0-2	10-40	1.25-1.32	4.00-14.00	0.10-0.15	3.0-5.9	0.5-1.0	.17	.24	1	4	86
	2-8	15-35	1.20-1.35	4.00-14.00	0.10-0.15	3.0-5.9	0.0-0.5	.17	.24			
	8-27	---	---	---	---	---	---	---	---			
	27-35	---	---	---	---	---	---	---	---			
Cerro Mariquita-----	0-2	30-50	1.25-1.32	4.00-14.00	0.10-0.15	3.0-5.9	1.0-2.0	.17	.24	1	4	86
	2-13	50-65	1.20-1.35	1.00-10.00	0.10-0.15	3.0-5.9	0.5-1.0	.17	.24			
	13-23	---	---	---	---	---	---	---	---			
	23-35	---	---	---	---	---	---	---	---			

Table 21.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>g/cc</i>	<i>µm/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
BmD:												
Bermeja-----	0-2	10-40	1.25-1.32	4.00-14.00	0.10-0.15	3.0-5.9	0.5-1.0	.17	.24	1	4	86
	2-8	15-35	1.20-1.35	4.00-14.00	0.10-0.15	3.0-5.9	0.0-0.5	.17	.24			
	8-27	---	---	---	---	---	---	---	---			
	27-35	---	---	---	---	---	---	---	---			
Cerro Mariquita-----	0-2	30-50	1.25-1.32	4.00-14.00	0.10-0.15	3.0-5.9	1.0-2.0	.17	.24	1	4	86
	2-13	50-65	1.20-1.35	1.00-10.00	0.10-0.15	3.0-5.9	0.5-1.0	.17	.24			
	13-23	---	---	---	---	---	---	---	---			
	23-35	---	---	---	---	---	---	---	---			
BmF:												
Bermeja-----	0-2	10-40	1.25-1.32	4.00-14.00	0.10-0.15	3.0-5.9	0.5-1.0	.17	.24	1	4	86
	2-8	15-35	1.20-1.35	4.00-14.00	0.10-0.15	3.0-5.9	0.0-0.5	.17	.24			
	8-27	---	---	---	---	---	---	---	---			
	27-35	---	---	---	---	---	---	---	---			
Cerro Mariquita-----	0-2	30-50	1.25-1.32	4.00-14.00	0.10-0.15	3.0-5.9	1.0-2.0	.17	.24	1	4	86
	2-13	50-65	1.20-1.35	1.00-10.00	0.10-0.15	3.0-5.9	0.5-1.0	.17	.24			
	13-23	---	---	---	---	---	---	---	---			
	23-35	---	---	---	---	---	---	---	---			
BrF:												
Bermeja-----	0-2	10-40	1.25-1.32	4.00-14.00	0.10-0.15	3.0-5.9	0.5-1.0	.17	.24	1	4	86
	2-8	15-35	1.20-1.35	4.00-14.00	0.10-0.15	3.0-5.9	0.0-0.5	.17	.24			
	8-27	---	---	---	---	---	---	---	---			
	27-35	---	---	---	---	---	---	---	---			
Rock outcrop.												
CaC:												
Cabo Rojo-----	0-2	35-50	1.20-1.30	1.40-4.00	0.15-0.20	3.0-5.9	2.0-5.0	.10	.10	5	4	86
	2-26	50-85	1.25-1.35	0.01-0.10	0.15-0.20	3.0-5.9	0.1-1.0	.10	.10			
	26-36	30-40	1.30-1.40	0.10-1.00	0.13-0.17	3.0-5.9	0.0-0.1	.10	.10			
	36-72	30-40	1.30-1.40	0.10-1.00	0.13-0.17	3.0-5.9	0.0-0.1	.10	.10			
CbD:												
Caguabo-----	0-6	20-40	1.00-1.45	1.00-10.00	0.11-0.14	1.0-2.9	2.0-7.0	.17	.24	1	6	48
	6-13	20-40	1.20-1.45	0.10-1.00	0.18-0.20	1.0-2.9	0.5-3.0	.17	.24			
	13-19	---	---	---	---	---	---	---	---			
	>19	---	---	---	---	---	---	---	---			

Table 21.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								Kw	Kf	T		
	In	Pct	g/cc	µm/sec	In/in	Pct	Pct					
CbF:												
Caguabo-----	0-6	20-40	1.00-1.45	1.00-10.00	0.11-0.14	1.0-2.9	2.0-7.0	.17	.24	1	6	48
	6-13	20-40	1.20-1.45	0.10-1.00	0.18-0.20	1.0-2.9	0.5-3.0	.17	.24			
	13-19	---	---	---	---	---	---	---	---			
	>19	---	---	---	---	---	---	---	---			
CeA:												
Cartagena-----	0-7	30-60	1.25-1.60	0.10-1.00	0.13-0.16	9.0-25.0	2.0-4.0	.24	.24	5	4	86
	7-15	30-60	1.25-1.60	0.10-1.00	0.13-0.16	9.0-25.0	2.0-4.0	.24	.24			
	15-46	40-60	1.25-1.60	0.10-1.00	0.10-0.13	9.0-25.0	1.0-2.5	.24	.24			
	46-60	50-65	1.25-1.60	0.10-1.00	0.10-0.13	9.0-25.0	0.0-1.0	.24	.24			
CgD:												
Casabe-----	0-7	40-60	1.00-1.05	0.10-1.00	0.00-0.10	1.0-2.8	4.0-8.0	.10	.28	3	4	86
	7-9	40-60	0.90-1.00	0.10-1.00	0.00-0.10	3.0-6.0	2.0-3.0	.10	.28			
	9-38	---	---	---	---	---	---	---	---			
	38-41	---	---	---	---	---	---	---	---			
CgF:												
Casabe-----	0-7	40-60	1.00-1.05	0.10-1.00	0.00-0.10	1.0-2.8	4.0-8.0	.10	.28	3	4	86
	7-9	40-60	0.90-1.00	0.10-1.00	0.00-0.10	3.0-6.0	2.0-3.0	.10	.28			
	9-38	---	---	---	---	---	---	---	---			
	38-41	---	---	---	---	---	---	---	---			
ChA:												
Cataño-----	0-8	1-3	1.50-1.60	10.00-141.00	0.07-0.09	0.0-2.9	1.0-3.0	.10	.10	5	1	220
	8-11	0-3	1.55-1.60	10.00-141.00	0.05-0.08	0.0-2.9	0.5-1.0	.10	.10			
	11-72	0-3	1.55-1.60	10.00-141.00	0.05-0.08	0.0-2.9	0.5-1.0	.10	.10			
CjD:												
Cerro Gordo-----	0-3	0-0	0.45-1.00	42.00-337.00	0.15-0.20	---	15-95	---	---	5	4	86
	3-11	25-50	1.25-1.35	4.00-141.00	0.10-0.15	3.0-5.9	1.0-10	.02	.02			
	11-81	25-50	1.25-1.35	4.00-141.00	0.10-0.15	3.0-5.9	1.0-10	.02	.02			
CkD:												
Cerro Mariquita-----	0-2	30-50	1.25-1.32	4.00-14.00	0.10-0.15	3.0-5.9	1.0-2.0	.17	.24	1	4	86
	2-13	50-65	1.20-1.35	1.00-10.00	0.10-0.15	3.0-5.9	0.5-1.0	.17	.24			
	13-23	---	---	---	---	---	---	---	---			
	23-35	---	---	---	---	---	---	---	---			
CkF:												
Cerro Mariquita-----	0-2	30-50	1.25-1.32	4.00-14.00	0.10-0.15	3.0-5.9	1.0-2.0	.17	.24	1	4	86
	2-13	50-65	1.20-1.35	1.00-10.00	0.10-0.15	3.0-5.9	0.5-1.0	.17	.24			
	13-23	---	---	---	---	---	---	---	---			
	23-35	---	---	---	---	---	---	---	---			

Table 21.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								Kw	Kf	T		
	In	Pct	g/cc	µm/sec	In/in	Pct	Pct					
CmB: Coamo-----	0-9	25-40	1.15-1.25	1.00-10.00	0.17-0.19	3.0-6.0	3.0-6.0	.17	.17	3	4	86
	9-23	35-58	1.25-1.35	1.00-10.00	0.09-0.11	3.0-6.0	3.0-6.0	.24	.24			
	23-50	20-52	1.35-1.45	1.00-10.00	0.10-0.15	3.0-6.0	1.0-3.0	.10	.15			
	50-80	9-30	1.45-1.60	10.00-100.00	0.01-0.05	3.0-6.0	1.0-3.0	.10	.17			
CoA: Coloso-----	0-11	40-60	1.10-1.50	0.10-1.00	0.14-0.22	9.0-16.0	2.0-9.0	.24	.24	5	8	0
	11-31	35-60	0.50-1.10	0.10-1.00	0.12-0.18	9.0-16.0	0.3-6.0	.24	.24			
	31-90	35-75	0.50-1.00	0.10-1.00	0.12-0.18	9.0-25.0	0.2-1.7	.24	.24			
CsE: Consumo-----	0-5	28-40	1.15-1.25	1.00-10.00	0.09-0.18	0.0-9.0	1.0-10	.10	.10	5	4	86
	5-20	35-60	1.20-1.45	0.10-1.00	0.12-0.18	3.0-7.0	1.0-2.0	.10	.10			
	20-80	20-55	1.00-1.40	1.00-10.00	0.10-0.16	0.0-3.5	0.3-1.0	.10	.10			
CsF: Consumo-----	0-5	28-40	1.15-1.25	1.00-10.00	0.09-0.18	0.0-9.0	1.0-10	.10	.10	5	4	86
	5-20	35-60	1.20-1.45	0.10-1.00	0.12-0.18	3.0-7.0	1.0-2.0	.10	.10			
	20-80	20-55	1.00-1.40	1.00-10.00	0.10-0.16	0.0-3.5	0.3-1.0	.10	.10			
CtA: Cortada-----	0-6	10-38	1.10-1.15	1.00-10.00	0.21-0.22	0.0-2.9	4.0-8.0	.20	.20	5	4	86
	6-15	10-38	1.10-1.15	1.00-10.00	0.18-0.20	0.0-2.9	4.0-8.0	.20	.20			
	15-23	30-38	1.15-1.30	1.00-10.00	0.20-0.22	0.0-2.9	2.0-4.0	.20	.20			
	23-34	30-38	1.15-1.25	1.00-10.00	0.18-0.20	0.0-2.9	2.0-4.0	.17	.17			
	34-45	30-38	1.15-1.25	1.00-10.00	0.18-0.20	0.0-2.9	2.0-4.0	.20	.20			
	45-56	10-35	1.15-1.25	10.00-100.00	0.18-0.20	0.0-2.9	0.5-2.0	.20	.20			
	56-63	10-35	1.15-1.25	10.00-100.00	0.18-0.20	0.0-2.9	0.5-2.0	.20	.20			
	63-80	20-33	1.15-1.25	1.00-10.00	0.18-0.20	0.0-2.9	0.5-2.0	.17	.17			
CuD: Costa-----	0-7	30-60	0.90-1.00	0.10-1.00	0.05-0.10	0.0-2.9	2.0-8.0	.24	.28	1	8	0
	7-11	30-65	0.95-1.05	0.10-1.00	0.05-0.10	0.0-2.9	1.0-2.0	.24	.28			
	11-19	30-60	1.04-1.14	0.10-1.00	0.05-0.10	0.0-2.9	0.0-0.4	.24	.28			
	19-43	---	---	---	---	---	---	---	---			
	43-63	---	---	---	---	---	---	---	---			
Pitahaya-----	0-2	35-60	1.40-1.50	0.10-1.00	0.05-0.10	1.0-3.0	2.0-8.0	.24	.28	1	8	0
	2-11	35-60	1.40-1.50	0.10-1.00	0.05-0.10	1.0-3.0	1.0-2.0	.24	.28			
	11-27	---	---	---	---	---	---	---	---			
	27-80	---	---	---	---	---	---	---	---			

Table 21.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								Kw	Kf	T		
	In	Pct	g/cc	µm/sec	In/in	Pct	Pct					
CuF: Costa-----	0-7	30-60	0.90-1.00	0.10-1.00	0.05-0.10	0.0-2.9	2.0-8.0	.24	.28	1	8	0
	7-11	30-65	0.95-1.05	0.10-1.00	0.05-0.10	0.0-2.9	1.0-2.0	.24	.28			
	11-19	30-60	1.04-1.14	0.10-1.00	0.05-0.10	0.0-2.9	0.0-0.4	.24	.28			
	19-43	---	---	---	---	---	---	---	---			
	43-63	---	---	---	---	---	---	---	---			
Pitahaya-----	0-2	35-60	1.40-1.50	0.10-1.00	0.05-0.10	1.0-3.0	2.0-8.0	.24	.28	1	8	0
	2-11	35-60	1.40-1.50	0.10-1.00	0.05-0.10	1.0-3.0	1.0-2.0	.24	.28			
	11-27	---	---	---	---	---	---	---	---			
	27-80	---	---	---	---	---	---	---	---			
CvF: Cuchillas-----	0-6	28-40	0.02-2.60	1.00-10.00	0.15-0.20	3.0-6.0	5.0-10	.10	.10	3	4	86
	6-15	28-60	0.02-2.60	1.00-10.00	0.18-0.20	3.0-6.0	2.0-5.0	.10	.10			
	15-36	---	---	---	---	---	---	---	---			
	>36	---	---	---	---	---	---	---	---			
CvG: Cuchillas-----	0-6	28-40	0.02-2.60	1.00-10.00	0.15-0.20	3.0-6.0	5.0-10	.10	.10	3	4	86
	6-15	28-60	0.02-2.60	1.00-10.00	0.18-0.20	3.0-6.0	2.0-5.0	.10	.10			
	15-36	---	---	---	---	---	---	---	---			
	>36	---	---	---	---	---	---	---	---			
DeD: Delicias-----	0-6	40-70	1.35-1.80	1.00-10.00	0.10-0.15	3.0-5.9	1.0-5.0	.02	.02	5	4	86
	6-68	40-70	1.40-1.80	1.00-10.00	0.10-0.15	3.0-5.9	0.1-1.1	.02	.02			
DqA: Dique-----	0-12	10-27	1.15-1.30	1.00-10.00	0.10-0.15	0.0-2.9	1.0-4.0	.10	.10	5	6	48
	12-37	10-27	1.15-1.25	1.00-10.00	0.10-0.14	0.0-2.9	0.5-2.0	.10	.10			
	37-90	18-50	1.10-1.25	1.00-10.00	0.10-0.14	0.0-2.9	0.5-1.0	.10	.10			
DsC: Descalabrado-----	0-5	35-45	1.34-1.36	0.10-1.00	0.15-0.20	6.0-8.9	2.5-5.0	.24	.24	1	4	86
	5-10	35-45	1.30-1.40	0.10-1.00	0.10-0.15	6.0-8.9	1.8-4.0	.17	.24			
	10-18	---	---	---	---	---	---	---	---			
	>18	---	---	---	---	---	---	---	---			
DsD: Descalabrado-----	0-5	35-45	1.34-1.36	0.10-1.00	0.15-0.20	6.0-8.9	2.5-5.0	.24	.24	1	4	86
	5-10	35-45	1.30-1.40	0.10-1.00	0.10-0.15	6.0-8.9	1.8-4.0	.17	.24			
	10-18	---	---	---	---	---	---	---	---			
	>18	---	---	---	---	---	---	---	---			

Table 21.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>g/cc</i>	<i>µm/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
DsF:												
Descalabrado-----	0-5	35-45	1.34-1.36	0.10-1.00	0.15-0.20	6.0-8.9	2.5-5.0	.24	.24	1	4	86
	5-10	35-45	1.30-1.40	0.10-1.00	0.10-0.15	6.0-8.9	1.8-4.0	.17	.24			
	10-18	---	---	---	---	---	---	---	---			
	>18	---	---	---	---	---	---	---	---			
EcD:												
El Cacique-----	0-6	28-40	1.30-1.40	1.00-10.00	0.18-0.22	0.0-2.9	4.0-8.0	.10	.10	3	4	86
	6-11	35-60	1.40-1.50	0.10-1.00	0.10-0.15	3.0-5.9	2.0-3.0	.10	.28			
	11-14	---	---	---	---	---	---	---	---			
	14-86	---	---	---	---	---	---	---	---			
La Taína-----	0-8	35-60	1.30-1.40	0.10-1.00	0.18-0.22	0.0-2.9	4.0-8.0	.10	.10	3	4	86
	8-17	35-60	1.40-1.50	0.10-1.00	0.10-0.15	3.0-5.9	2.0-3.0	.10	.28			
	17-29	---	---	---	---	---	---	---	---			
	>29	---	---	---	---	---	---	---	---			
EcF:												
El Cacique-----	0-6	28-40	1.30-1.40	1.00-10.00	0.18-0.22	0.0-2.9	4.0-8.0	.10	.10	3	4	86
	6-11	35-60	1.40-1.50	0.10-1.00	0.10-0.15	3.0-5.9	2.0-3.0	.10	.28			
	11-14	---	---	---	---	---	---	---	---			
	14-86	---	---	---	---	---	---	---	---			
La Taína-----	0-8	35-60	1.30-1.40	0.10-1.00	0.18-0.22	0.0-2.9	4.0-8.0	.10	.10	3	4	86
	8-17	35-60	1.40-1.50	0.10-1.00	0.10-0.15	3.0-5.9	2.0-3.0	.10	.28			
	17-29	---	---	---	---	---	---	---	---			
	>29	---	---	---	---	---	---	---	---			
EcG:												
El Cacique-----	0-6	28-40	1.30-1.40	1.00-10.00	0.18-0.22	0.0-2.9	4.0-8.0	.10	.10	3	4	86
	6-11	35-60	1.40-1.50	0.10-1.00	0.10-0.15	3.0-5.9	2.0-3.0	.10	.28			
	11-14	---	---	---	---	---	---	---	---			
	14-86	---	---	---	---	---	---	---	---			
La Taína-----	0-8	35-60	1.30-1.40	0.10-1.00	0.18-0.22	0.0-2.9	4.0-8.0	.10	.10	3	4	86
	8-17	35-60	1.40-1.50	0.10-1.00	0.10-0.15	3.0-5.9	2.0-3.0	.10	.28			
	17-29	---	---	---	---	---	---	---	---			
	>29	---	---	---	---	---	---	---	---			
Edd:												
El Descanso-----	0-3	0-0	0.62-0.75	42.00-373.00	0.15-0.20	---	40-80	---	---	3	4	86
	3-8	30-45	1.00-1.35	1.00-10.00	0.15-0.20	3.0-5.9	4.0-8.0	.10	.10			
	8-15	40-55	0.80-1.25	1.00-10.00	0.15-0.20	1.0-3.0	2.0-3.0	.10	.28			
	15-80	---	---	---	---	---	---	---	---			

Table 21.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								Kw	Kf	T		
	In	Pct	g/cc	µm/sec	In/in	Pct	Pct					
EdD:												
Hoconuco-----	0-3	0-0	0.62-0.75	42.00-337.00	0.15-0.20	---	40-70	---	---	3	4	86
	3-7	30-50	1.00-1.35	0.10-1.00	0.15-0.20	0.0-1.0	4.0-8.0	.10	.10			
	7-14	40-55	0.80-1.25	0.10-1.00	0.15-0.20	0.0-1.0	2.0-3.0	.10	.28			
	14-37	---	---	---	---	---	---	---	---			
	37-80	---	---	---	---	---	---	---	---			
EdF:												
El Descanso-----	0-3	0-0	0.62-0.75	42.00-373.00	0.15-0.20	---	40-80	---	---	3	4	86
	3-8	30-45	1.00-1.35	1.00-10.00	0.15-0.20	3.0-5.9	4.0-8.0	.10	.10			
	8-15	40-55	0.80-1.25	1.00-10.00	0.15-0.20	1.0-3.0	2.0-3.0	.10	.28			
	15-80	---	---	---	---	---	---	---	---			
Hoconuco-----	0-3	0-0	0.62-0.75	42.00-337.00	0.15-0.20	---	40-70	---	---	3	4	86
	3-7	30-50	1.00-1.35	0.10-1.00	0.15-0.20	0.0-1.0	4.0-8.0	.10	.10			
	7-14	40-55	0.80-1.25	0.10-1.00	0.15-0.20	0.0-1.0	2.0-3.0	.10	.28			
	14-37	---	---	---	---	---	---	---	---			
	37-80	---	---	---	---	---	---	---	---			
EdG:												
El Descanso-----	0-3	0-0	0.62-0.75	42.00-373.00	0.15-0.20	---	40-80	---	---	3	4	86
	3-8	30-45	1.00-1.35	1.00-10.00	0.15-0.20	3.0-5.9	4.0-8.0	.10	.10			
	8-15	40-55	0.80-1.25	1.00-10.00	0.15-0.20	1.0-3.0	2.0-3.0	.10	.28			
	15-80	---	---	---	---	---	---	---	---			
Hoconuco-----	0-3	0-0	0.62-0.75	42.00-337.00	0.15-0.20	---	40-70	---	---	3	4	86
	3-7	30-50	1.00-1.35	0.10-1.00	0.15-0.20	0.0-1.0	4.0-8.0	.10	.10			
	7-14	40-55	0.80-1.25	0.10-1.00	0.15-0.20	0.0-1.0	2.0-3.0	.10	.28			
	14-37	---	---	---	---	---	---	---	---			
	37-80	---	---	---	---	---	---	---	---			
EpC:												
El Papayo-----	0-2	28-40	1.34-1.36	1.00-10.00	0.15-0.20	6.0-8.9	2.0-4.0	.24	.24	1	4	86
	2-14	30-60	1.30-1.40	0.10-1.00	0.10-0.15	6.0-8.9	1.0-2.0	.17	.24			
	14-16	---	---	---	---	---	---	---	---			
	>16	---	---	---	---	---	---	---	---			
EpD:												
El Papayo-----	0-2	28-40	1.34-1.36	1.00-10.00	0.15-0.20	6.0-8.9	2.0-4.0	.24	.24	1	4	86
	2-14	30-60	1.30-1.40	0.10-1.00	0.10-0.15	6.0-8.9	1.0-2.0	.17	.24			
	14-16	---	---	---	---	---	---	---	---			
	>16	---	---	---	---	---	---	---	---			

Table 21.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>g/cc</i>	<i>µm/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
EpF: El Papayo-----	0-2	28-40	1.34-1.36	1.00-10.00	0.15-0.20	6.0-8.9	2.0-4.0	.24	.24	1	4	86
	2-14	30-60	1.30-1.40	0.10-1.00	0.10-0.15	6.0-8.9	1.0-2.0	.17	.24			
	14-16	---	---	---	---	---	---	---	---			
	>16	---	---	---	---	---	---	---	---			
FeA: Fé-----	0-7	45-58	1.30-1.40	0.10-1.00	0.13-0.16	6.0-8.9	3.0-5.0	.24	.24	5	4	86
	7-17	45-58	1.30-1.40	0.10-1.00	0.12-0.14	9.0-25.0	1.0-5.0	.24	.24			
	17-42	50-58	1.30-1.40	0.10-1.00	0.10-0.13	9.0-25.0	0.1-3.0	.24	.24			
	42-56	45-58	1.30-1.40	0.10-1.00	0.10-0.13	9.0-25.0	0.1-3.0	.24	.24			
FrA: Fraternidad-----	0-13	40-60	1.17-1.25	0.01-0.10	0.12-0.18	9.0-16.0	2.0-4.0	.24	.24	5	4	86
	13-17	40-60	1.17-1.25	0.01-0.10	0.12-0.18	9.0-16.0	1.0-2.0	.24	.24			
	17-65	40-66	1.20-1.25	0.01-0.10	0.12-0.18	9.0-18.0	0.0-0.5	.24	.24			
FrB: Fraternidad-----	0-13	40-60	1.17-1.25	0.01-0.10	0.12-0.18	9.0-16.0	2.0-4.0	.24	.24	5	4	86
	13-17	40-60	1.17-1.25	0.01-0.10	0.12-0.18	9.0-16.0	1.0-2.0	.24	.24			
	17-65	40-66	1.20-1.25	0.01-0.10	0.12-0.18	9.0-18.0	0.0-0.5	.24	.24			
GbF: Guanábano-----	0-2	40-62	1.20-1.30	4.00-14.00	0.20-0.25	6.0-8.9	3.0-5.0	.17	.24	5	4	86
	2-6	50-60	1.25-1.35	1.40-4.00	0.12-0.15	6.0-8.9	2.0-4.0	.24	.24			
	6-13	35-60	1.25-1.35	0.10-1.00	0.15-0.20	3.0-5.9	2.0-4.0	.20	.28			
	13-21	33-60	1.25-1.35	0.10-1.00	0.05-0.10	3.0-5.9	0.5-1.0	.20	.28			
	21-80	30-35	1.30-1.40	14.00-42.00	0.05-0.10	0.0-2.9	0.0-0.5	.10	.28			
GhC: Guanajibo-----	0-10	20-40	1.35-1.45	1.00-10.00	0.05-0.10	0.0-2.9	2.0-5.0	.10	.10	5	6	48
	10-21	35-75	1.35-1.45	0.10-1.00	0.10-0.15	0.0-2.9	1.0-3.0	.10	.10			
	21-63	35-75	1.30-1.40	0.10-1.00	0.15-0.20	0.0-2.9	0.5-1.5	.10	.10			
GnA: Guánica-----	0-4	65-85	0.90-1.20	0.01-0.10	0.09-0.15	9.0-25.0	3.0-5.5	.24	.24	5	4	86
	4-12	65-85	0.90-1.20	0.01-0.10	0.10-0.15	9.0-25.0	1.0-3.5	.24	.24			
	12-52	60-85	0.90-1.20	0.01-0.10	0.07-0.11	9.0-25.0	0.5-1.5	.24	.24			
	52-79	60-85	0.90-1.20	0.01-0.10	0.05-0.10	9.0-25.0	0.0-0.5	.24	.24			
GuB: Guayabo-----	0-7	1-2	1.40-1.55	141.00-141.00	0.05-0.08	0.0-2.9	0.5-1.0	.10	.10	5	1	220
	7-55	1-2	1.45-1.60	141.00-141.00	0.05-0.08	0.0-2.9	0.1-1.0	.10	.10			
	55-65	0-12	1.60-1.70	42.00-141.00	0.05-0.08	0.0-2.9	0.1-0.5	.10	.10			
	65-75	0-12	1.60-1.70	42.00-141.00	0.05-0.08	0.0-2.9	0.1-0.5	.10	.10			

Table 21.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								Kw	Kf	T		
	In	Pct	g/cc	µm/sec	In/in	Pct	Pct					
GyB: Guayacán-----	0-8	20-60	1.10-1.15	0.10-1.00	0.10-0.15	0.0-2.9	2.0-8.0	.10	.17	3	4L	86
	8-12	20-60	1.25-1.40	0.10-1.00	0.10-0.20	0.0-2.9	1.0-2.0	.10	.15			
	12-26	20-60	1.25-1.40	0.10-1.00	0.10-0.20	0.0-2.9	1.0-2.0	.10	.15			
	26-45	10-50	1.20-1.30	1.00-10.00	0.08-0.15	0.0-2.9	0.0-0.0	.20	.20			
	45-59	5-40	1.20-1.70	1.00-10.00	0.08-0.15	0.0-2.9	0.0-0.0	.32	.32			
	59-76	5-40	1.50-1.71	1.00-10.00	0.08-0.15	0.0-2.9	0.0-0.0	.20	.20			
	76-91	5-40	1.20-1.30	1.00-10.00	0.08-0.15	0.0-2.9	0.0-0.0	.20	.20			
GyC: Guayacán-----	0-8	20-60	1.10-1.15	0.10-1.00	0.10-0.15	0.0-2.9	2.0-8.0	.10	.17	3	4L	86
	8-12	20-60	1.25-1.40	0.10-1.00	0.10-0.20	0.0-2.9	1.0-2.0	.10	.15			
	12-26	20-60	1.25-1.40	0.10-1.00	0.10-0.20	0.0-2.9	1.0-2.0	.10	.15			
	26-45	10-50	1.20-1.30	1.00-10.00	0.08-0.15	0.0-2.9	0.0-0.0	.20	.20			
	45-59	5-40	1.20-1.70	1.00-10.00	0.08-0.15	0.0-2.9	0.0-0.0	.32	.32			
	59-76	5-40	1.50-1.71	1.00-10.00	0.08-0.15	0.0-2.9	0.0-0.0	.20	.20			
	76-91	5-40	1.20-1.30	1.00-10.00	0.08-0.15	0.0-2.9	0.0-0.0	.20	.20			
GyD: Guayacán-----	0-8	20-60	1.10-1.15	0.10-1.00	0.10-0.15	0.0-2.9	2.0-8.0	.10	.17	3	4L	86
	8-12	20-60	1.25-1.40	0.10-1.00	0.10-0.20	0.0-2.9	1.0-2.0	.10	.15			
	12-26	20-60	1.25-1.40	0.10-1.00	0.10-0.20	0.0-2.9	1.0-2.0	.10	.15			
	26-45	10-50	1.20-1.30	1.00-10.00	0.08-0.15	0.0-2.9	0.0-0.0	.20	.20			
	45-59	5-40	1.20-1.70	1.00-10.00	0.08-0.15	0.0-2.9	0.0-0.0	.32	.32			
	59-76	5-40	1.50-1.71	1.00-10.00	0.08-0.15	0.0-2.9	0.0-0.0	.20	.20			
	76-91	5-40	1.20-1.30	1.00-10.00	0.08-0.15	0.0-2.9	0.0-0.0	.20	.20			
HmD: Humatas-----	0-5	40-65	1.00-1.25	0.10-1.00	0.12-0.18	3.0-8.5	2.0-8.0	.02	.02	5	4	86
	5-32	60-80	1.00-1.25	0.10-1.00	0.12-0.18	6.0-8.9	1.0-4.0	.02	.02			
	32-44	28-65	1.00-1.50	0.10-1.00	0.12-0.18	3.0-5.9	0.5-1.0	.02	.02			
	44-65	28-45	1.00-1.50	0.10-1.00	0.10-0.16	0.0-4.0	0.5-1.0	.02	.02			
HmE: Humatas-----	0-5	40-65	1.00-1.25	0.10-1.00	0.12-0.18	3.0-8.5	2.0-8.0	.02	.02	5	4	86
	5-32	60-80	1.00-1.25	0.10-1.00	0.12-0.18	6.0-8.9	1.0-4.0	.02	.02			
	32-44	28-65	1.00-1.50	0.10-1.00	0.12-0.18	3.0-5.9	0.5-1.0	.02	.02			
	44-65	28-45	1.00-1.50	0.10-1.00	0.10-0.16	0.0-4.0	0.5-1.0	.02	.02			
HmF: Humatas-----	0-5	40-65	1.00-1.25	0.10-1.00	0.12-0.18	3.0-8.5	2.0-8.0	.02	.02	5	4	86
	5-32	60-80	1.00-1.25	0.10-1.00	0.12-0.18	6.0-8.9	1.0-4.0	.02	.02			
	32-44	28-65	1.00-1.50	0.10-1.00	0.12-0.18	3.0-5.9	0.5-1.0	.02	.02			
	44-65	28-45	1.00-1.50	0.10-1.00	0.10-0.16	0.0-4.0	0.5-1.0	.02	.02			

Table 21.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>g/cc</i>	<i>µm/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
JaB:												
Jácana-----	0-20	40-60	1.25-1.30	1.00-10.00	0.15-0.20	6.0-8.9	3.0-5.0	.10	.10	3	4	86
	20-30	40-60	1.25-1.30	0.10-1.00	0.15-0.20	6.0-8.9	1.0-3.0	.24	.24			
	30-33	20-40	1.28-1.32	1.00-10.00	0.12-0.18	0.0-2.9	0.3-2.0	.17	.17			
	>33	---	---	---	---	---	---	---	---			
JaC:												
Jácana-----	0-20	40-60	1.25-1.30	1.00-10.00	0.15-0.20	6.0-8.9	3.0-5.0	.10	.10	3	4	86
	20-30	40-60	1.25-1.30	0.10-1.00	0.15-0.20	6.0-8.9	1.0-3.0	.24	.24			
	30-33	20-40	1.28-1.32	1.00-10.00	0.12-0.18	0.0-2.9	0.3-2.0	.17	.17			
	>33	---	---	---	---	---	---	---	---			
JBA:												
Joyuda-----	0-4	0-0	0.62-0.75	42.00-337.00	0.15-0.20	---	11-45	---	---	5	4	86
	4-80	0-0	0.62-0.75	42.00-337.00	0.15-0.20	---	11-45	---	---			
Atolladero-----	0-2	10-25	1.55-1.65	42.00-337.00	0.18-0.20	---	20-45	---	---	5	4L	86
	2-32	5-20	1.55-1.60	42.00-141.00	0.05-0.08	0.0-2.9	4.0-8.0	.10	.10			
	32-60	0-12	1.55-1.60	42.00-141.00	0.05-0.08	0.0-2.9	2.0-4.0	.10	.10			
Bajura-----	0-4	40-60	1.30-1.40	0.10-1.00	0.14-0.22	9.0-15.0	2.0-6.0	.24	.24	5	4	86
	4-16	40-60	1.30-1.40	0.01-0.10	0.12-0.18	9.0-15.0	0.3-6.0	.24	.24			
	16-42	40-60	1.30-1.40	0.01-0.10	0.12-0.18	9.0-15.0	0.2-1.0	.24	.24			
	42-80	40-60	1.30-1.35	0.01-0.10	0.12-0.18	9.0-15.0	0.2-0.5	.24	.24			
LcE:												
La Covana-----	0-5	30-65	0.58-1.00	0.10-1.00	0.05-0.10	3.0-5.9	2.0-8.0	.24	.28	1	4L	86
	5-19	30-60	0.58-1.00	0.10-1.00	0.05-0.10	3.0-5.9	2.0-4.0	.24	.28			
	19-31	---	---	---	---	---	---	---	---			
	31-80	5-35	0.58-1.00	1.00-10.00	0.05-0.10	3.0-5.9	0.5-1.0	.24	.28			
Limestone outcrop.												
LdA:												
La Luna-----	0-11	27-40	1.10-1.15	0.10-10.00	0.21-0.22	0.0-2.9	4.0-6.0	.20	.20	5	4	86
	11-20	27-40	1.10-1.15	0.10-1.00	0.18-0.20	0.0-2.9	3.0-4.0	.20	.20			
	20-58	27-40	1.15-1.30	0.10-1.00	0.20-0.22	0.0-2.9	1.0-2.0	.17	.17			
	58-75	20-40	1.15-1.25	0.10-1.00	0.18-0.20	0.0-2.9	0.5-2.0	.20	.20			

Table 21.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								Kw	Kf	T		
	In	Pct	g/cc	µm/sec	In/in	Pct	Pct					
LeF:												
La Tea-----	0-5	60-75	1.25-1.35	0.10-1.00	0.05-0.10	0.0-2.9	4.0-8.0	.24	.28	1	8	0
	5-11	60-75	1.25-1.35	0.10-1.00	0.05-0.10	0.0-2.9	2.0-4.0	.24	.28			
	11-16	60-75	1.25-1.35	0.10-1.00	0.01-0.06	0.0-2.9	2.0-4.0	.24	.28			
	16-18	---	---	---	---	---	---	---	---			
	18-40	---	---	---	---	---	---	---	---			
Limestone outcrop.												
LfC:												
Landfill.												
LkB:												
Lares-----	0-2	45-60	1.00-1.10	1.00-10.00	0.12-0.18	3.0-8.0	2.0-7.0	.10	.10	5	4	86
	2-5	45-60	1.00-1.25	1.00-10.00	0.12-0.18	3.0-5.9	2.0-7.0	.10	.10			
	5-28	60-75	1.10-1.30	0.10-1.00	0.12-0.18	3.0-5.9	0.5-2.0	.10	.10			
	28-43	40-75	1.10-1.30	1.00-10.00	0.12-0.18	3.0-5.9	0.2-0.5	.10	.10			
	43-83	30-58	1.00-1.50	1.00-10.00	0.07-0.13	3.0-5.9	0.0-0.2	.10	.10			
LnA:												
Llanos Costa-----	0-9	15-50	1.20-1.30	1.00-10.00	0.15-0.20	3.0-5.9	2.0-4.0	.17	.17	5	4	86
	9-15	30-50	1.40-1.45	1.00-10.00	0.10-0.18	3.0-5.9	0.5-3.0	.17	.24			
	15-43	30-50	1.45-1.60	0.10-1.00	0.07-0.10	3.0-5.9	0.4-1.0	.17	.24			
	43-78	28-40	1.60-1.70	1.00-10.00	0.05-0.08	3.0-5.9	0.1-0.5	.17	.24			
LnB:												
Llanos Costa-----	0-9	15-50	1.20-1.30	1.00-10.00	0.15-0.20	3.0-5.9	2.0-4.0	.17	.17	5	4	86
	9-15	30-50	1.40-1.45	1.00-10.00	0.10-0.18	3.0-5.9	0.5-3.0	.17	.24			
	15-43	30-50	1.45-1.60	0.10-1.00	0.07-0.10	3.0-5.9	0.4-1.0	.17	.24			
	43-78	28-40	1.60-1.70	1.00-10.00	0.05-0.08	3.0-5.9	0.1-0.5	.17	.24			
LnC:												
Llanos Costa-----	0-9	15-50	1.20-1.30	1.00-10.00	0.15-0.20	3.0-5.9	2.0-4.0	.17	.17	5	4	86
	9-15	30-50	1.40-1.45	1.00-10.00	0.10-0.18	3.0-5.9	0.5-3.0	.17	.24			
	15-43	30-50	1.45-1.60	0.10-1.00	0.07-0.10	3.0-5.9	0.4-1.0	.17	.24			
	43-78	28-40	1.60-1.70	1.00-10.00	0.05-0.08	3.0-5.9	0.1-0.5	.17	.24			
LpG:												
Los Penones-----	0-8	0-0	0.49-0.54	42.00-337.00	0.15-0.20	---	40-80	---	---	1	8	0
	>8	---	---	---	---	---	---	---	---			
Limestone outcrop.												

Table 21.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>g/cc</i>	<i>µm/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
MaB: Mabí-----	0-7	55-60	1.20-1.30	0.10-1.00	0.12-0.18	9.0-25.0	2.0-4.0	.24	.24	5	4	86
	7-50	55-60	1.20-1.30	0.10-1.00	0.12-0.18	9.0-25.0	0.5-2.0	.24	.24			
	50-74	55-60	1.20-1.35	0.10-1.00	0.12-0.18	9.0-25.0	0.1-0.3	.24	.24			
MbA: Maguayo-----	0-6	5-40	1.20-1.35	1.00-10.00	0.11-0.17	1.0-2.9	3.0-5.0	.10	.17	4	6	48
	6-12	5-40	1.30-1.50	1.00-10.00	0.15-0.19	2.0-6.0	2.0-5.0	.10	.10			
	12-35	26-60	1.35-1.50	0.01-0.10	0.16-0.20	3.0-9.0	0.5-3.0	.10	.10			
	35-65	26-60	1.25-1.60	0.01-0.10	0.07-0.12	3.0-9.0	0.2-2.0	.10	.17			
MbC: Maguayo-----	0-6	5-40	1.20-1.35	1.00-10.00	0.11-0.17	1.0-2.9	3.0-5.0	.10	.17	4	6	48
	6-12	5-40	1.30-1.50	1.00-10.00	0.15-0.19	2.0-6.0	2.0-5.0	.10	.10			
	12-35	26-60	1.35-1.50	0.01-0.10	0.16-0.20	3.0-9.0	0.5-3.0	.10	.10			
	35-65	26-60	1.25-1.60	0.01-0.10	0.07-0.12	3.0-9.0	0.2-2.0	.10	.17			
McF: Malaya-----	0-4	42-60	1.08-1.35	0.10-1.00	0.15-0.20	6.0-12.9	4.0-8.0	.24	.24	3	4	86
	4-10	35-50	1.08-1.30	0.10-1.00	0.10-0.20	6.0-11.5	2.0-5.0	.17	.24			
	10-72	---	---	---	---	---	---	---	---			
MDA: Manglillo-----	0-5	0-0	0.60-0.75	4.00-14.00	0.15-0.20	---	33-56	---	---	5	8	0
	5-24	0-0	0.60-0.75	4.00-14.00	0.15-0.20	---	33-56	---	---			
	24-43	10-25	1.20-1.30	0.42-1.40	0.15-0.20	3.0-6.0	4.0-12	.24	.24			
	43-60	0-18	1.20-1.30	0.42-1.40	0.15-0.20	3.0-6.0	4.0-12	.24	.24			
Boquerón-----	0-2	0-0	0.10-0.30	4.00-14.00	0.15-0.20	---	60-80	---	---	5	8	0
	2-4	30-55	1.20-1.40	4.00-14.00	0.12-0.15	6.0-8.9	4.0-10	.24	.24			
	4-8	30-55	1.20-1.35	0.01-0.42	0.15-0.20	6.0-8.9	4.0-8.0	.24	.24			
	8-55	30-55	1.20-1.35	0.01-0.42	0.15-0.20	6.0-8.9	4.0-8.0	.24	.24			
	55-79	40-70	1.20-1.35	0.01-0.42	0.15-0.20	6.0-8.9	4.0-6.0	.24	.24			
Serrano-----	0-3	10-20	1.55-1.65	10.00-100.00	0.00-0.05	0.0-2.9	1.0-4.0	.10	.10	3	1	220
	3-14	20-35	1.35-1.40	10.00-100.00	0.10-0.15	0.0-2.9	1.0-2.0	.10	.10			
	14-65	10-25	1.50-1.55	10.00-100.00	0.01-0.05	0.0-2.9	0.5-1.0	.05	.05			
MeA: Maní-----	0-13	40-59	1.20-1.40	0.10-1.00	0.15-0.20	6.0-8.9	1.0-4.0	.17	.17	5	4	86
	13-41	40-59	1.20-1.40	0.10-1.00	0.15-0.20	6.0-8.9	0.2-2.0	.17	.17			
	41-90	40-55	1.20-1.40	0.10-1.00	0.15-0.20	3.0-6.0	0.1-1.0	.10	.10			

Table 21.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								Kw	Kf	T		
	In	Pct	g/cc	µm/sec	In/in	Pct	Pct					
MfF:												
Maresúa-----	0-1	25-40	1.00-1.60	1.00-10.00	0.18-0.22	---	50-60	---	---	3	4	86
	1-4	25-40	0.50-1.00	1.00-10.00	0.10-0.15	3.0-15.0	3.0-9.0	.10	.28			
	4-10	35-60	1.00-1.20	1.00-10.00	0.10-0.15	3.0-6.0	3.0-7.0	.10	.28			
	10-26	35-60	1.00-1.20	1.00-10.00	0.10-0.15	3.0-5.9	2.0-4.0	.10	.28			
	26-46	---	---	---	---	---	---	---	---			
	>46	---	---	---	---	---	---	---	---			
MgF:												
Maresúa-----	0-1	25-40	1.00-1.60	1.00-10.00	0.18-0.22	---	50-60	---	---	3	4	86
	1-4	25-40	0.50-1.00	1.00-10.00	0.10-0.15	3.0-15.0	3.0-9.0	.10	.28			
	4-10	35-60	1.00-1.20	1.00-10.00	0.10-0.15	3.0-6.0	3.0-7.0	.10	.28			
	10-26	35-60	1.00-1.20	1.00-10.00	0.10-0.15	3.0-5.9	2.0-4.0	.10	.28			
	26-46	---	---	---	---	---	---	---	---			
	>46	---	---	---	---	---	---	---	---			
Serpentinite outcrop.												
MiD:												
Mariana-----	0-8	29-45	1.20-1.30	1.00-10.00	0.15-0.20	3.0-6.0	2.0-6.0	.10	.17	4	4	86
	8-15	35-50	1.15-1.25	1.00-10.00	0.15-0.20	3.0-6.0	2.0-4.0	.10	.17			
	15-32	35-55	1.20-1.35	0.10-1.00	0.15-0.20	3.0-6.0	0.5-2.0	.17	.17			
	32-49	30-50	1.30-1.35	0.10-1.00	0.15-0.20	3.0-6.0	0.4-1.0	.17	.17			
	49-59	30-50	1.30-1.40	0.10-1.00	0.15-0.20	3.0-6.0	0.2-0.5	.17	.17			
MiE:												
Mariana-----	0-8	29-45	1.20-1.30	1.00-10.00	0.15-0.20	3.0-6.0	2.0-6.0	.10	.17	4	4	86
	8-15	35-50	1.15-1.25	1.00-10.00	0.15-0.20	3.0-6.0	2.0-4.0	.10	.17			
	15-32	35-55	1.20-1.35	0.10-1.00	0.15-0.20	3.0-6.0	0.5-2.0	.17	.17			
	32-49	30-50	1.30-1.35	0.10-1.00	0.15-0.20	3.0-6.0	0.4-1.0	.17	.17			
	49-59	30-50	1.30-1.40	0.10-1.00	0.15-0.20	3.0-6.0	0.2-0.5	.17	.17			
MkF:												
Maricao-----	0-5	30-65	1.10-1.20	0.10-1.00	0.15-0.18	3.0-9.0	4.0-10	.10	.10	5	4	0
	5-11	30-60	1.10-1.20	0.10-1.00	0.15-0.18	3.0-6.0	1.0-2.0	.10	.10			
	11-29	40-70	1.20-1.30	0.10-1.00	0.15-0.18	3.0-6.0	2.0-6.0	.10	.10			
	29-46	40-60	1.20-1.30	0.10-1.00	0.10-0.15	2.0-6.0	0.5-1.0	.10	.10			
	46-63	30-60	1.15-1.20	1.00-10.00	0.10-0.15	2.0-3.0	0.5-1.0	.10	.10			
MkG:												
Maricao-----	0-5	30-65	1.10-1.20	0.10-1.00	0.15-0.18	3.0-9.0	4.0-10	.10	.10	5	4	0
	5-11	30-60	1.10-1.20	0.10-1.00	0.15-0.18	3.0-6.0	1.0-2.0	.10	.10			
	11-29	40-70	1.20-1.30	0.10-1.00	0.15-0.18	3.0-6.0	2.0-6.0	.10	.10			
	29-46	40-60	1.20-1.30	0.10-1.00	0.10-0.15	2.0-6.0	0.5-1.0	.10	.10			
	46-63	30-60	1.15-1.20	1.00-10.00	0.10-0.15	2.0-3.0	0.5-1.0	.10	.10			

Table 21.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>g/cc</i>	<i>µm/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
MnA: Melones-----	0-7	35-60	1.25-1.35	0.10-1.00	0.12-0.18	3.0-5.9	2.0-4.0	.24	.24	5	4	86
	7-18	35-60	1.25-1.35	0.10-1.00	0.12-0.18	6.0-9.0	2.0-3.0	.24	.24			
	18-46	35-60	1.25-1.35	0.10-1.00	0.12-0.18	6.0-9.0	0.2-2.0	.24	.24			
	46-66	35-60	1.25-1.35	0.10-1.00	0.12-0.18	6.0-9.0	0.2-2.0	.24	.24			
	66-70	35-60	1.20-1.35	0.42-1.40	0.12-0.18	6.0-9.0	0.2-2.0	.24	.24			
	70-79	35-60	1.25-1.40	0.10-1.00	0.12-0.18	6.0-9.0	0.2-2.0	.24	.24			
MnC: Melones-----	0-7	35-60	1.25-1.35	0.10-1.00	0.12-0.18	3.0-5.9	2.0-4.0	.24	.24	5	4	86
	7-18	35-60	1.25-1.35	0.10-1.00	0.12-0.18	6.0-9.0	2.0-3.0	.24	.24			
	18-46	35-60	1.25-1.35	0.10-1.00	0.12-0.18	6.0-9.0	0.2-2.0	.24	.24			
	46-66	35-60	1.25-1.35	0.10-1.00	0.12-0.18	6.0-9.0	0.2-2.0	.24	.24			
	66-70	35-60	1.20-1.35	0.42-1.40	0.12-0.18	6.0-9.0	0.2-2.0	.24	.24			
	70-79	35-60	1.25-1.40	0.10-1.00	0.12-0.18	6.0-9.0	0.2-2.0	.24	.24			
MoB: Montalva-----	0-6	35-55	1.25-1.30	0.10-1.00	0.15-0.20	6.0-8.9	2.0-4.0	.10	.10	3	4	86
	6-16	45-55	1.25-1.30	0.10-1.00	0.15-0.20	6.0-8.9	1.0-2.0	.24	.24			
	16-29	45-55	1.25-1.30	0.10-1.00	0.15-0.20	6.0-8.9	1.0-2.0	.24	.24			
	29-32	30-45	1.28-1.32	1.00-10.00	0.12-0.18	3.0-6.0	0.5-1.0	.17	.17			
	32-40	---	---	---	---	---	---	---	---			
MoC: Montalva-----	0-6	35-55	1.25-1.30	0.10-1.00	0.15-0.20	6.0-8.9	2.0-4.0	.10	.10	3	4	86
	6-16	45-55	1.25-1.30	0.10-1.00	0.15-0.20	6.0-8.9	1.0-2.0	.24	.24			
	16-29	45-55	1.25-1.30	0.10-1.00	0.15-0.20	6.0-8.9	1.0-2.0	.24	.24			
	29-32	30-45	1.28-1.32	1.00-10.00	0.12-0.18	3.0-6.0	0.5-1.0	.17	.17			
	32-40	---	---	---	---	---	---	---	---			
MqC: Montegrando-----	0-6	50-65	1.10-1.40	0.10-1.00	0.15-0.17	9.0-25.0	1.0-4.0	.10	.10	4	4	86
	6-10	50-65	1.10-1.40	0.10-1.00	0.15-0.17	9.0-25.0	1.0-4.0	.10	.10			
	10-24	50-75	1.15-1.40	0.10-1.00	0.15-0.17	9.0-25.0	0.5-1.0	.10	.10			
	24-65	40-80	1.40-1.50	0.10-1.00	0.05-0.08	6.0-25.0	0.1-0.5	.05	.17			
MrD: Morado-----	0-5	28-40	1.30-1.40	0.10-1.00	0.17-0.19	0.0-2.9	2.0-5.0	.10	.10	3	4	86
	5-16	25-50	1.30-1.45	0.01-0.10	0.15-0.19	0.0-2.9	0.5-1.0	.10	.10			
	16-21	12-40	1.35-1.45	0.10-1.00	0.07-0.19	0.0-2.9	0.0-0.2	.10	.10			
	21-31	---	---	---	---	---	---	---	---			
	31-80	---	---	---	---	---	---	---	---			

Table 21.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								Kw	Kf	T		
	In	Pct	g/cc	µm/sec	In/in	Pct	Pct					
MrE: Morado-----	0-5	28-40	1.30-1.40	0.10-1.00	0.17-0.19	0.0-2.9	2.0-5.0	.10	.10	3	4	86
	5-16	25-50	1.30-1.45	0.01-0.10	0.15-0.19	0.0-2.9	0.5-1.0	.10	.10			
	16-21	12-40	1.35-1.45	0.10-1.00	0.07-0.19	0.0-2.9	0.0-0.2	.10	.10			
	21-31	---	---	---	---	---	---	---	---			
	31-80	---	---	---	---	---	---	---	---			
MrF: Morado-----	0-5	28-40	1.30-1.40	0.10-1.00	0.17-0.19	0.0-2.9	2.0-5.0	.10	.10	3	4	86
	5-16	25-50	1.30-1.45	0.01-0.10	0.15-0.19	0.0-2.9	0.5-1.0	.10	.10			
	16-21	12-40	1.35-1.45	0.10-1.00	0.07-0.19	0.0-2.9	0.0-0.2	.10	.10			
	21-31	---	---	---	---	---	---	---	---			
	31-80	---	---	---	---	---	---	---	---			
MuC: Múcara-----	0-5	20-41	1.00-2.00	0.10-1.00	0.11-0.14	6.0-9.0	2.0-7.0	.10	.10	3	4	86
	5-18	12-41	1.00-2.00	0.10-1.00	0.18-0.20	3.0-6.0	0.5-3.0	.24	.24			
	18-32	13-35	1.00-2.00	1.00-10.00	0.00-0.01	3.0-6.0	0.1-1.0	.24	.24			
	>32	---	---	---	---	---	---	---	---			
MuD: Múcara-----	0-5	20-41	1.00-2.00	0.10-1.00	0.11-0.14	6.0-9.0	2.0-7.0	.10	.10	3	4	86
	5-18	12-41	1.00-2.00	0.10-1.00	0.18-0.20	3.0-6.0	0.5-3.0	.24	.24			
	18-32	13-35	1.00-2.00	1.00-10.00	0.00-0.01	3.0-6.0	0.1-1.0	.24	.24			
	>32	---	---	---	---	---	---	---	---			
MuE: Múcara-----	0-5	20-41	1.00-2.00	0.10-1.00	0.11-0.14	6.0-9.0	2.0-7.0	.10	.10	3	4	86
	5-18	12-41	1.00-2.00	0.10-1.00	0.18-0.20	3.0-6.0	0.5-3.0	.24	.24			
	18-32	13-35	1.00-2.00	1.00-10.00	0.00-0.01	3.0-6.0	0.1-1.0	.24	.24			
	>32	---	---	---	---	---	---	---	---			
MuF: Múcara-----	0-5	20-41	1.00-2.00	0.10-1.00	0.11-0.14	6.0-9.0	2.0-7.0	.10	.10	3	4	86
	5-18	12-41	1.00-2.00	0.10-1.00	0.18-0.20	3.0-6.0	0.5-3.0	.24	.24			
	18-32	13-35	1.00-2.00	1.00-10.00	0.00-0.01	3.0-6.0	0.1-1.0	.24	.24			
	>32	---	---	---	---	---	---	---	---			
NpD: Nipe-----	0-2	0-0	0.40-1.50	1.00-12.00	0.10-0.15	---	10-15	---	---	5	4	86
	2-7	40-60	1.00-1.50	1.00-10.00	0.10-0.15	2.0-4.0	1.0-10	.02	.02			
	7-11	40-70	1.00-1.50	1.00-10.00	0.10-0.15	1.0-5.9	0.3-5.0	.02	.02			
	11-60	40-70	1.00-1.50	1.00-10.00	0.15-0.20	1.0-5.9	0.4-1.1	.10	.10			

Table 21.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>g/cc</i>	<i>µm/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
OrA: Olivares-----	0-2	0-0	0.62-0.75	42.00-373.00	0.15-0.20	---	11-70	---	---	5	4L	86
	2-25	40-55	1.40-1.50	0.10-1.00	0.05-0.08	3.0-6.0	4.0-8.0	.10	.10			
	25-48	40-55	1.40-1.50	0.10-1.00	0.05-0.08	3.0-6.0	2.0-4.0	.10	.10			
	48-80	40-55	1.40-1.50	0.10-1.00	0.05-0.08	3.0-6.0	1.0-2.0	.10	.10			
PaA: Palmarejo-----	0-9	20-40	1.30-1.35	1.00-10.00	0.10-0.15	0.0-2.9	2.5-5.0	.10	.10	5	6	48
	9-30	35-60	1.20-1.25	0.10-1.00	0.15-0.20	3.0-5.9	1.0-2.0	.10	.10			
	30-41	20-40	1.25-1.28	1.00-10.00	0.15-0.20	0.0-2.9	0.3-1.0	.10	.10			
	41-51	20-40	1.35-1.40	1.00-10.00	0.10-0.20	0.0-2.9	0.1-1.0	.10	.10			
PaB: Palmarejo-----	0-9	20-40	1.30-1.35	1.00-10.00	0.10-0.15	0.0-2.9	2.5-5.0	.10	.10	5	6	48
	9-30	35-60	1.20-1.25	0.10-1.00	0.15-0.20	3.0-5.9	1.0-2.0	.10	.10			
	30-41	20-40	1.25-1.28	1.00-10.00	0.15-0.20	0.0-2.9	0.3-1.0	.10	.10			
	41-51	20-40	1.35-1.40	1.00-10.00	0.10-0.20	0.0-2.9	0.1-1.0	.10	.10			
PaC: Palmarejo-----	0-9	20-40	1.30-1.35	1.00-10.00	0.10-0.15	0.0-2.9	2.5-5.0	.10	.10	5	6	48
	9-30	35-60	1.20-1.25	1.00-10.00	0.15-0.20	3.0-5.9	1.0-2.0	.10	.10			
	30-41	20-40	1.25-1.28	1.00-10.00	0.15-0.20	0.0-2.9	0.3-1.0	.10	.10			
	41-51	20-40	1.35-1.40	1.00-10.00	0.10-0.20	0.0-2.9	0.1-1.0	.10	.10			
PgA: Parguera-----	0-7	38-60	1.00-1.25	0.10-1.00	0.12-0.18	0.0-3.0	2.0-7.0	.24	.24	5	4	86
	7-22	38-60	1.20-1.25	0.10-1.00	0.12-0.18	0.0-3.0	2.0-3.0	.24	.24			
	22-39	15-60	1.20-1.40	1.00-10.00	0.09-0.18	0.0-3.0	0.6-2.0	.24	.24			
	39-57	15-60	1.20-1.25	1.00-10.00	0.12-0.18	0.0-3.0	0.2-2.0	.24	.24			
	57-79	50-60	1.20-1.40	0.10-1.00	0.12-0.18	0.0-3.0	0.2-1.0	.24	.24			
PgB: Parguera-----	0-7	38-60	1.00-1.25	0.10-1.00	0.12-0.18	0.0-3.0	2.0-7.0	.24	.24	5	4	86
	7-22	38-60	1.20-1.25	0.10-1.00	0.12-0.18	0.0-3.0	2.0-3.0	.24	.24			
	22-39	15-60	1.20-1.40	1.00-10.00	0.09-0.18	0.0-3.0	0.6-2.0	.24	.24			
	39-57	15-60	1.20-1.25	1.00-10.00	0.12-0.18	0.0-3.0	0.2-2.0	.24	.24			
	57-79	50-60	1.20-1.40	0.10-1.00	0.12-0.18	0.0-3.0	0.2-1.0	.24	.24			
PsF: Pitahaya-----	0-2	35-60	1.40-1.50	0.10-1.00	0.05-0.10	1.0-3.0	2.0-8.0	.24	.28	1	8	0
	2-11	35-60	1.40-1.50	0.10-1.00	0.05-0.10	1.0-3.0	1.0-2.0	.24	.28			
	11-27	---	---	---	---	---	---	---	---			
	27-80	---	---	---	---	---	---	---	---			
Limestone outcrop.												

Table 21.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								Kw	Kf	T		
	In	Pct	g/cc	µm/sec	In/in	Pct	Pct					
PsF:												
Seboruco-----	0-2	15-40	1.45-1.55	1.00-10.00	0.08-0.12	1.0-3.0	2.0-4.0	.17	.28	3	4	86
	2-7	30-50	1.45-1.55	1.00-10.00	0.05-0.10	1.0-3.0	2.0-4.0	.17	.28			
	7-11	30-50	1.40-1.50	0.10-1.00	0.05-0.10	1.0-3.0	2.0-4.0	.17	.28			
	11-19	15-50	1.45-1.55	1.00-10.00	0.05-0.10	1.0-3.0	1.0-2.0	.17	.28			
	19-26	15-50	1.45-1.55	1.00-10.00	0.05-0.10	1.0-3.0	1.0-2.0	.17	.28			
	26-31	10-30	1.45-1.55	1.00-10.00	0.05-0.10	1.0-3.0	1.0-2.0	.17	.28			
	>31	---	---	---	---	---	---	---	---			
PsG:												
Pitahaya-----	0-2	35-60	1.40-1.50	0.10-1.00	0.05-0.10	1.0-3.0	2.0-8.0	.24	.28	1	8	0
	2-11	35-60	1.40-1.50	0.10-1.00	0.05-0.10	1.0-3.0	1.0-2.0	.24	.28			
	11-27	---	---	---	---	---	---	---	---			
	27-80	---	---	---	---	---	---	---	---			
Limestone outcrop.												
Seboruco-----	0-2	15-40	1.45-1.55	1.00-10.00	0.08-0.12	1.0-3.0	2.0-4.0	.17	.28	3	4	86
	2-7	30-50	1.45-1.55	1.00-10.00	0.05-0.10	1.0-3.0	2.0-4.0	.17	.28			
	7-11	30-50	1.40-1.50	0.10-1.00	0.05-0.10	1.0-3.0	2.0-4.0	.17	.28			
	11-19	15-50	1.45-1.55	1.00-10.00	0.05-0.10	1.0-3.0	1.0-2.0	.17	.28			
	19-26	15-50	1.45-1.55	1.00-10.00	0.05-0.10	1.0-3.0	1.0-2.0	.17	.28			
	26-31	10-30	1.45-1.55	1.00-10.00	0.05-0.10	1.0-3.0	1.0-2.0	.17	.28			
	>31	---	---	---	---	---	---	---	---			
Pt:												
Pits and quarries.												
PzB:												
Pozo Blanco-----	0-7	40-60	1.10-1.40	0.10-1.00	0.10-0.15	0.0-2.9	5.0-10	.10	.17	3	4L	86
	7-22	30-60	1.20-1.30	0.10-1.00	0.10-0.20	0.0-2.9	3.0-7.0	.10	.15			
	22-30	20-60	1.20-1.40	0.10-1.00	0.10-0.20	0.0-2.9	1.0-2.0	.10	.15			
	30-60	15-40	1.20-1.30	1.00-10.00	0.08-0.15	0.0-2.9	0.5-1.0	.20	.20			
PzC:												
Pozo Blanco-----	0-7	40-60	1.10-1.40	0.10-1.00	0.10-0.15	0.0-2.9	5.0-10	.10	.17	3	4L	86
	7-22	30-60	1.20-1.30	0.10-1.00	0.10-0.20	0.0-2.9	3.0-7.0	.10	.15			
	22-30	20-60	1.20-1.40	0.10-1.00	0.10-0.20	0.0-2.9	1.0-2.0	.10	.15			
	30-60	15-40	1.20-1.30	1.00-10.00	0.08-0.15	0.0-2.9	0.5-1.0	.20	.20			
PzD:												
Pozo Blanco-----	0-7	40-60	1.10-1.40	0.10-1.00	0.10-0.15	0.0-2.9	5.0-10	.10	.17	3	4L	86
	7-22	30-60	1.20-1.30	0.10-1.00	0.10-0.20	0.0-2.9	3.0-7.0	.10	.15			
	22-30	20-60	1.20-1.40	0.10-1.00	0.10-0.20	0.0-2.9	1.0-2.0	.10	.15			
	30-60	15-40	1.20-1.30	1.00-10.00	0.08-0.15	0.0-2.9	0.5-1.0	.20	.20			

Table 21.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>g/cc</i>	<i>µm/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
QbD: Quebrada-----	0-2 2-19 19-60	18-42 35-50 ---	1.30-1.40 1.30-1.40 ---	4.00-14.00 4.00-14.00 ---	0.15-0.20 0.15-0.20 ---	6.0-8.9 6.0-8.9 ---	1.0-3.0 0.5-2.0 ---	.20 .20 ---	.20 .20 ---	5	4	86
QbE: Quebrada-----	0-2 2-19 19-60	18-42 35-50 ---	1.30-1.40 1.30-1.40 ---	4.00-14.00 4.00-14.00 ---	0.15-0.20 0.15-0.20 ---	6.0-8.9 6.0-8.9 ---	1.0-3.0 0.5-2.0 ---	.20 .20 ---	.20 .20 ---	5	4	86
QbF: Quebrada-----	0-2 2-19 19-60	18-42 35-50 ---	1.30-1.40 1.30-1.40 ---	4.00-14.00 4.00-14.00 ---	0.15-0.20 0.15-0.20 ---	6.0-8.9 6.0-8.9 ---	1.0-3.0 0.5-2.0 ---	.20 .20 ---	.20 .20 ---	5	4	86
ReA: Reilly-----	0-4 4-17 17-75	10-20 3-20 3-5	1.40-1.50 1.45-1.60 1.45-1.60	14.00-42.00 141.00-141.00 141.00-141.00	0.05-0.10 0.01-0.05 0.01-0.05	0.0-2.9 0.0-2.9 0.0-2.9	2.0-5.0 0.5-2.0 0.1-1.0	.10 .05 .05	.20 .15 .15	3	5	56
RoD: Rosario-----	0-2 2-6 6-32 32-44 >44	0-0 35-60 35-60 --- ---	0.40-0.50 0.50-1.00 0.50-1.00 --- ---	0.10-10.00 1.00-10.00 1.00-10.00 --- ---	0.01-0.01 0.15-0.20 0.15-0.20 --- ---	--- 3.0-5.9 3.0-5.9 --- ---	25-70 3.0-12 1.0-5.0 --- ---	--- .10 .10 --- ---	--- .10 .10 --- ---	2	4	86
RoE: Rosario-----	0-2 2-6 6-32 32-44 >44	0-0 35-60 35-60 --- ---	0.40-0.50 0.50-1.00 0.50-1.00 --- ---	0.10-10.00 1.00-10.00 1.00-10.00 --- ---	0.01-0.01 0.15-0.20 0.15-0.20 --- ---	--- 3.0-5.9 3.0-5.9 --- ---	25-70 3.0-12 1.0-5.0 --- ---	--- .10 .10 --- ---	--- .10 .10 --- ---	2	4	86
RoF: Rosario-----	0-2 2-6 6-32 32-44 >44	0-0 35-60 35-60 --- ---	0.40-0.50 0.50-1.00 0.50-1.00 --- ---	0.10-10.00 1.00-10.00 1.00-10.00 --- ---	0.01-0.01 0.15-0.20 0.15-0.20 --- ---	--- 3.0-5.9 3.0-5.9 --- ---	25-70 3.0-12 1.0-5.0 --- ---	--- .10 .10 --- ---	--- .10 .10 --- ---	2	4	86

Table 21.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								Kw	Kf	T		
	In	Pct	g/cc	µm/sec	In/in	Pct	Pct					
RuF:												
Rubias-----	0-8	28-38	1.00-1.20	1.00-10.00	0.15-0.20	3.0-6.0	2.0-4.0	.24	.24	3	6	48
	8-18	30-38	1.00-1.20	2.00-5.00	0.15-0.20	3.0-6.0	2.0-4.0	.24	.24			
	18-25	10-28	0.90-1.10	5.00-10.00	0.15-0.20	2.0-2.8	0.5-0.8	.17	.17			
	25-50	---	---	---	---	---	---	---	---			
	>50	---	---	---	---	---	---	---	---			
Chiquito-----	0-5	28-40	1.00-1.45	1.00-10.00	0.11-0.14	1.0-2.9	2.0-7.0	.17	.24	3	6	48
	5-18	28-40	1.20-1.45	1.00-10.00	0.18-0.20	1.0-2.9	0.5-3.0	.17	.24			
	>18	---	---	---	---	---	---	---	---			
RuG:												
Rubias-----	0-8	28-38	1.00-1.20	1.00-10.00	0.15-0.20	3.0-6.0	2.0-4.0	.24	.24	3	6	48
	8-18	30-38	1.00-1.20	2.00-5.00	0.15-0.20	3.0-6.0	2.0-4.0	.24	.24			
	18-25	10-28	0.90-1.10	5.00-10.00	0.15-0.20	2.0-2.8	0.5-0.8	.17	.17			
	25-50	---	---	---	---	---	---	---	---			
	>50	---	---	---	---	---	---	---	---			
Chiquito-----	0-5	28-40	1.00-1.45	1.00-10.00	0.11-0.14	1.0-2.9	2.0-7.0	.17	.24	3	6	48
	5-18	28-40	1.20-1.45	1.00-10.00	0.18-0.20	1.0-2.9	0.5-3.0	.17	.24			
	>18	---	---	---	---	---	---	---	---			
Sa:												
Salt flats, ponded.												
Sb:												
Salt pits.												
SCA:												
San Anton-----	0-8	28-45	1.25-1.35	4.00-14.00	0.11-0.20	3.0-5.9	2.0-6.0	.17	.20	5	4	86
	8-13	28-45	1.25-1.35	4.00-14.00	0.10-0.20	0.0-2.9	2.0-3.0	.17	.24			
	13-24	22-45	1.23-1.35	4.00-14.00	0.12-0.20	3.0-5.9	0.3-2.0	.17	.17			
	24-31	22-50	1.23-1.35	4.00-14.00	0.12-0.20	3.0-5.9	0.3-2.0	.17	.17			
	31-41	22-45	1.40-1.45	4.00-42.00	0.12-0.20	0.0-2.9	0.3-2.0	.17	.17			
	41-54	22-45	1.23-1.35	4.00-42.00	0.12-0.20	3.0-5.9	0.3-2.0	.17	.17			
	54-70	22-45	1.20-1.35	4.00-42.00	0.12-0.20	0.0-2.9	0.3-2.0	.17	.17			
SdD:												
San Germán-----	0-4	35-50	1.40-1.50	0.10-1.00	0.05-0.10	0.0-2.9	2.0-25	.24	.28	1	8	0
	4-10	35-50	1.40-1.50	0.10-1.00	0.05-0.10	0.0-2.9	1.0-25	.24	.28			
	10-60	---	---	---	---	---	---	---	---			
SdF:												
San Germán-----	0-4	35-50	1.40-1.50	0.10-1.00	0.05-0.10	0.0-2.9	2.0-25	.24	.28	1	8	0
	4-10	35-50	1.40-1.50	0.10-1.00	0.05-0.10	0.0-2.9	1.0-25	.24	.28			
	10-60	---	---	---	---	---	---	---	---			

Table 21.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>g/cc</i>	<i>µm/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
SgD:												
San Germán-----	0-4	35-50	1.40-1.50	0.10-1.00	0.05-0.10	0.0-2.9	2.0-25	.24	.28	1	8	0
	4-10	35-50	1.40-1.50	0.10-1.00	0.05-0.10	0.0-2.9	1.0-25	.24	.28			
	10-60	---	---	---	---	---	---	---	---			
Duey-----	0-13	30-50	1.40-1.50	14.00-42.00	0.05-0.10	0.0-2.9	2.0-4.0	.24	.28	1	8	0
	13-17	30-60	1.40-1.50	14.00-42.00	0.05-0.10	0.0-2.9	1.0-3.0	.24	.28			
	17-35	---	---	---	---	---	---	---	---			
	35-80	---	---	---	---	---	---	---	---			
SgF:												
San Germán-----	0-4	35-50	1.40-1.50	0.10-1.00	0.05-0.10	0.0-2.9	2.0-25	.24	.28	1	8	0
	4-10	35-50	1.40-1.50	0.10-1.00	0.05-0.10	0.0-2.9	1.0-25	.24	.28			
	10-60	---	---	---	---	---	---	---	---			
Duey-----	0-13	30-50	1.40-1.50	14.00-42.00	0.05-0.10	0.0-2.9	2.0-4.0	.24	.28	1	8	0
	13-17	30-60	1.40-1.50	14.00-42.00	0.05-0.10	0.0-2.9	1.0-3.0	.24	.28			
	17-35	---	---	---	---	---	---	---	---			
	35-80	---	---	---	---	---	---	---	---			
SiA:												
Santa Isabel-----	0-10	35-60	1.25-1.35	0.01-0.10	0.07-0.13	9.0-15.0	3.0-5.0	.24	.24	5	4	86
	10-63	40-60	1.25-1.35	0.01-0.10	0.13-0.16	9.0-15.0	0.5-4.0	.24	.24			
	63-69	40-60	1.15-1.30	0.01-0.10	0.13-0.16	9.0-15.0	0.5-4.0	.24	.24			
SmE:												
Santa Marta-----	0-8	36-55	1.20-1.40	4.00-10.00	0.15-0.20	1.0-3.0	1.0-4.0	.10	.10	3	4	86
	8-21	39-59	1.20-1.40	4.00-10.00	0.15-0.20	1.0-3.0	1.0-4.0	.10	.10			
	21-37	39-59	1.20-1.40	4.00-10.00	0.15-0.20	1.0-3.0	1.0-2.0	.10	.10			
	37-57	---	---	---	---	---	---	---	---			
	57-64	---	---	---	---	---	---	---	---			
SoC:												
Seboruco-----	0-2	15-40	1.45-1.55	1.00-10.00	0.08-0.12	1.0-3.0	2.0-4.0	.17	.28	3	4	86
	2-7	30-50	1.45-1.55	1.00-10.00	0.05-0.10	1.0-3.0	2.0-4.0	.17	.28			
	7-11	30-50	1.40-1.50	0.10-1.00	0.05-0.10	1.0-3.0	2.0-4.0	.17	.28			
	11-19	15-50	1.45-1.55	1.00-10.00	0.05-0.10	1.0-3.0	1.0-2.0	.17	.28			
	19-26	15-50	1.45-1.55	1.00-10.00	0.05-0.10	1.0-3.0	1.0-2.0	.17	.28			
	26-31	10-30	1.45-1.55	1.00-10.00	0.05-0.10	1.0-3.0	1.0-2.0	.17	.28			
	>31	---	---	---	---	---	---	---	---			

Table 21.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								Kw	Kf	T		
	In	Pct	g/cc	µm/sec	In/in	Pct	Pct					
SsB:												
Sosa-----	0-5	12-18	1.55-1.70	10.00-100.00	0.07-0.12	0.0-2.9	1.0-2.0	.10	.10	3	3	86
	5-12	12-18	1.60-1.75	10.00-100.00	0.05-0.10	0.0-2.9	1.0-2.0	.10	.17			
	12-20	25-45	1.55-1.70	0.10-1.00	0.09-0.15	0.0-2.9	1.0-2.0	.10	.10			
	20-33	38-45	1.65-1.80	0.10-1.00	0.05-0.10	0.0-2.9	0.5-1.0	.10	.10			
	33-63	25-45	1.65-1.90	1.00-10.00	0.03-0.10	0.0-2.9	0.2-1.0	.10	.10			
SsC:												
Sosa-----	0-5	12-18	1.55-1.70	10.00-100.00	0.07-0.12	0.0-2.9	1.0-2.0	.10	.10	3	3	86
	5-12	12-18	1.60-1.75	10.00-100.00	0.05-0.10	0.0-2.9	1.0-2.0	.10	.17			
	12-20	25-45	1.55-1.70	0.10-1.00	0.09-0.15	0.0-2.9	1.0-2.0	.10	.10			
	20-33	38-45	1.65-1.80	0.10-1.00	0.05-0.10	0.0-2.9	0.5-1.0	.10	.10			
	33-63	25-45	1.65-1.90	1.00-10.00	0.03-0.10	0.0-2.9	0.2-1.0	.10	.10			
TeA:												
Teresa-----	0-10	55-66	1.18-1.25	0.10-1.00	0.15-0.18	6.0-9.0	2.0-4.0	.24	.24	5	4	86
	10-38	55-65	1.18-1.25	0.10-1.00	0.15-0.18	6.0-9.0	0.1-0.5	.24	.24			
	38-44	55-65	1.18-1.25	0.10-1.00	0.15-0.18	6.0-9.0	0.1-0.5	.24	.24			
	44-78	50-60	1.18-1.25	0.10-1.00	0.15-0.18	6.0-9.0	0.1-0.5	.24	.24			
	78-85	50-60	1.18-1.25	0.10-1.00	0.15-0.18	6.0-9.0	0.1-0.5	.24	.24			
TfA:												
Teresa, ponded-----	0-10	55-66	1.18-1.25	0.10-1.00	0.15-0.18	6.0-9.0	2.0-4.0	.24	.24	5	4	86
	10-38	55-65	1.18-1.25	0.10-1.00	0.15-0.18	6.0-9.0	0.1-0.5	.24	.24			
	38-44	55-65	1.18-1.25	0.10-1.00	0.15-0.18	6.0-9.0	0.1-0.5	.24	.24			
	44-78	50-60	1.18-1.25	0.10-1.00	0.15-0.18	6.0-9.0	0.1-0.5	.24	.24			
	78-85	50-60	1.18-1.25	0.10-1.00	0.15-0.18	6.0-9.0	0.1-0.5	.24	.24			
ToA:												
Toa-----	0-8	25-45	1.30-1.55	1.00-10.00	0.15-0.20	2.0-5.9	1.0-4.0	.17	.17	5	7	38
	8-17	28-45	1.35-1.55	1.00-10.00	0.15-0.20	2.0-5.9	1.0-4.0	.17	.17			
	17-43	30-45	1.35-1.50	1.00-10.00	0.15-0.20	3.0-5.9	1.0-2.0	.17	.17			
	43-64	30-45	1.25-1.50	1.00-10.00	0.15-0.20	3.0-5.9	0.5-1.0	.20	.20			
Ua:												
Urban land.												
Ubb:												
Urban land.												
Bahía-----	0-6	3-6	1.50-1.70	10.00-100.00	0.07-0.09	0.0-2.9	0.5-1.0	.02	.02	5	1	220
	6-45	5-13	1.50-1.65	10.00-100.00	0.09-0.11	0.0-2.9	0.0-1.0	.10	.10			
	45-66	16-18	1.50-1.65	10.00-100.00	0.14-0.16	0.0-2.9	0.0-1.0	.10	.10			

Table 21.--Physical Soil Properties--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>g/cc</i>	<i>µm/sec</i>	<i>In/in</i>	<i>Pct</i>	<i>Pct</i>					
UgB: Urban land.												
Guayabo-----	0-7	1-2	1.40-1.55	141.00-141.00	0.05-0.08	0.0-2.9	0.5-1.0	.10	.10	5	1	220
	7-55	1-2	1.45-1.60	141.00-141.00	0.05-0.08	0.0-2.9	0.1-1.0	.10	.10			
	55-65	0-12	1.60-1.70	42.00-141.00	0.05-0.08	0.0-2.9	0.1-0.5	.10	.10			
	65-75	0-12	1.60-1.70	42.00-141.00	0.05-0.08	0.0-2.9	0.1-0.5	.10	.10			
UsC: Urban land.												
Sosa-----	0-5	12-18	1.55-1.70	10.00-100.00	0.07-0.12	0.0-2.9	1.0-2.0	.10	.10	3	3	86
	5-12	12-18	1.60-1.75	10.00-100.00	0.05-0.10	0.0-2.9	1.0-2.0	.10	.17			
	12-20	25-45	1.55-1.70	0.10-1.00	0.09-0.15	0.0-2.9	1.0-2.0	.10	.10			
	20-33	38-45	1.65-1.80	0.10-1.00	0.05-0.10	0.0-2.9	0.5-1.0	.10	.10			
	33-63	25-45	1.65-1.90	1.00-10.00	0.03-0.10	0.0-2.9	0.2-1.0	.10	.10			
VaA: Vayas-----	0-5	28-60	1.30-1.40	0.10-1.00	0.14-0.22	6.0-9.0	2.0-4.0	.24	.24	5	4	86
	5-12	28-60	1.30-1.40	0.10-1.00	0.12-0.18	3.0-6.0	0.3-2.0	.24	.24			
	12-23	28-60	1.30-1.40	0.10-1.00	0.12-0.18	3.0-6.0	0.2-1.0	.24	.24			
	23-62	10-60	1.30-1.35	0.10-1.00	0.12-0.18	3.0-6.0	0.2-0.5	.24	.24			
VoC: Voladora-----	0-2	42-70	1.25-1.35	0.10-1.00	0.15-0.20	3.0-5.9	2.0-4.0	.02	.02	5	4	86
	2-15	40-70	1.25-1.40	0.10-1.00	0.15-0.20	3.0-5.9	1.0-4.0	.02	.02			
	15-48	30-50	1.25-1.35	0.10-1.00	0.15-0.20	3.0-5.9	1.0-3.0	.02	.02			
	48-60	30-50	1.25-1.35	0.10-1.00	0.15-0.20	0.0-2.9	0.5-3.0	.02	.02			
VoD: Voladora-----	0-2	42-70	1.25-1.35	0.10-1.00	0.15-0.20	3.0-5.9	2.0-4.0	.02	.02	5	4	86
	2-15	40-70	1.25-1.40	0.10-1.00	0.15-0.20	3.0-5.9	1.0-4.0	.02	.02			
	15-48	30-50	1.25-1.35	0.10-1.00	0.15-0.20	3.0-5.9	1.0-3.0	.02	.02			
	48-60	30-50	1.25-1.35	0.10-1.00	0.15-0.20	0.0-2.9	0.5-3.0	.02	.02			
W: Water.												

Soil Survey of San Germán Area, Puerto Rico

Table 22.--Chemical Soil Properties

[Absence of an entry indicates that data were not estimated]

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction	Calcium carbon- ate	Gypsum	Salinity	Sodium adsorp- tion ratio
	<i>Inches</i>	<i>meq/100 g</i>	<i>meq/100 g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
AbF:								
Agüeybaná-----	0-14	---	---	4.5-5.5	0	0	0.1-0.2	0
	14-44	---	1.7-2.5	4.3-5.5	0	0	0	0
	44-60	---	---	4.1-5.5	0	0	0	0
	60-74	---	---	4.1-5.5	0	0	0	0
AgD:								
Aguilita-----	0-6	35-50	---	7.4-8.4	35-45	0	0.0-2.0	0-5
	6-23	30-40	---	7.4-8.4	75-91	0	0.0-2.0	0-5
	23-60	30-45	---	7.4-8.4	15-39	0	0.0-3.0	12-15
AgF:								
Aguilita-----	0-6	35-50	---	7.4-8.4	35-45	0	0.0-2.0	0-5
	6-23	30-40	---	7.4-8.4	75-91	0	0.0-2.0	0-5
	23-60	30-45	---	7.4-8.4	15-39	0	0.0-3.0	12-15
AkA:								
Aguirre-----	0-18	---	---	7.4-8.4	1-5	0	---	---
	18-80	---	---	7.9-8.4	5-15	0	---	---
AlF:								
Aljibe-----	0-5	---	---	4.5-6.0	0	0	0	0
	5-16	---	10-16	4.5-6.0	0	0	0	0
	16-31	---	3.0-10	5.6-6.5	0	0	0	0
	31-35	---	7.0-10	6.6-7.3	0	0	0	0
	35-47	---	---	---	---	---	---	---
	47-80	---	---	---	---	---	---	---
Guamá-----	0-4	---	25-173	4.5-6.0	0	0	0	0
	4-13	---	10-16	4.5-6.0	0	0	0	0
	13-39	---	3.0-10	5.6-6.5	0	0	0	0
	39-61	---	7.0-10	6.1-7.3	0	0	0	0
	61-82	---	---	6.1-7.3	0	0	0	0
Indiera-----	0-3	---	---	4.5-5.5	0	0	0	0
	3-8	---	10-16	4.5-5.5	0	0	0	0
	8-22	---	3.0-10	5.6-6.5	0	0	0	0
	22-47	---	7.0-10	6.1-7.3	0	0	0	0
	47-82	---	---	---	---	---	---	---
	>82	---	---	---	---	---	---	---
AtD:								
Altamira-----	0-8	35-40	---	7.9-9.0	30-45	0	0.0-2.0	0-1
	8-14	20-30	---	7.9-9.0	60-80	0	0.0-2.0	0-1
	14-43	15-25	---	7.9-9.0	60-80	0	0.0-2.0	0-5
	43-54	35-45	---	7.9-9.0	20-40	0	0.0-2.2	0-13
	54-79	---	---	---	---	---	---	---
AtF:								
Altamira-----	0-8	35-40	---	7.9-9.0	30-45	0	0.0-2.0	0-1
	8-14	20-30	---	7.9-9.0	60-80	0	0.0-2.0	0-1
	14-43	15-25	---	7.9-9.0	60-80	0	0.0-2.0	0-5
	43-54	35-45	---	7.9-9.0	20-40	0	0.0-2.2	0-13
	54-79	---	---	---	---	---	---	---

Soil Survey of San Germán Area, Puerto Rico

Table 22.--Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction	Calcium carbon- ate	Gypsum	Salinity	Sodium adsorp- tion ratio
	<i>Inches</i>	<i>meq/100 g</i>	<i>meq/100 g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
BaB:								
Bahía-----	0-6	1.0-2.0	---	5.1-6.0	0-1	0	0.0-2.0	0-2
	6-45	1.0-2.0	---	5.6-6.5	0-1	0	0.0-2.0	0-2
	45-66	1.0-3.0	---	6.1-7.3	0-1	0	0.0-2.0	0-2
BhB:								
Bahía Salinas-----	0-6	0.0-10	---	7.9-8.4	10-50	0	8.0-16.0	0-10
	6-28	0.0-10	---	7.9-8.4	10-50	0	8.0-16.0	0-10
BjA:								
Bajura-----	0-4	30-40	---	5.6-8.4	0	0	0	0
	4-16	25-35	---	5.6-8.4	0	0	0	0
	16-42	25-35	---	5.6-8.4	0	0	0	0
	42-80	25-35	---	5.6-8.4	0	0	0	0
BkB:								
Beaches.								
BmC:								
Bermeja-----	0-2	---	---	5.1-6.5	0	0	0	0
	2-8	---	4.6-18	5.1-6.5	0	0	0	0
	8-27	---	---	---	---	---	---	---
	27-35	---	---	---	---	---	---	---
Cerro Mariquita-----	0-2	16-27	---	6.1-8.4	0	0	0	0
	2-13	26-34	---	6.1-8.0	0	0	0	0
	13-23	---	---	---	---	---	---	---
	23-35	---	---	---	---	---	---	---
BmD:								
Bermeja-----	0-2	---	---	5.1-6.5	0	0	0	0
	2-8	---	4.6-18	5.1-6.5	0	0	0	0
	8-27	---	---	---	---	---	---	---
	27-35	---	---	---	---	---	---	---
Cerro Mariquita-----	0-2	16-27	---	6.1-8.4	0	0	0	0
	2-13	26-34	---	6.1-8.0	0	0	0	0
	13-23	---	---	---	---	---	---	---
	23-35	---	---	---	---	---	---	---
BmF:								
Bermeja-----	0-2	---	---	5.1-6.5	0	0	0	0
	2-8	---	4.6-18	5.1-6.5	0	0	0	0
	8-27	---	---	---	---	---	---	---
	27-35	---	---	---	---	---	---	---
Cerro Mariquita-----	0-2	16-27	---	6.1-8.4	0	0	0	0
	2-13	26-34	---	6.1-8.0	0	0	0	0
	13-23	---	---	---	---	---	---	---
	23-35	---	---	---	---	---	---	---
BrF:								
Bermeja-----	0-2	---	---	5.1-6.5	0	0	0	0
	2-8	---	4.6-18	5.1-6.5	0	0	0	0
	8-27	---	---	---	---	---	---	---
	27-35	---	---	---	---	---	---	---
Rock outcrop.								

Soil Survey of San Germán Area, Puerto Rico

Table 22.--Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction	Calcium carbon- ate	Gypsum	Salinity	Sodium adsorp- tion ratio
	<i>Inches</i>	<i>meq/100 g</i>	<i>meq/100 g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
CaC:								
Cabo Rojo-----	0-2	---	20-25	5.1-5.5	0	0	0	0
	2-26	---	13-26	5.1-6.5	0	0	0	0
	26-36	---	13-20	6.1-6.5	0	0	0	0
	36-72	---	13-20	6.1-6.5	0	0	0	0
Cbd:								
Caguabo-----	0-6	11-27	---	5.6-7.3	0	0	0	0
	6-13	11-27	---	5.6-7.3	0	0	0	0
	13-19	---	---	---	---	---	---	---
	>19	---	---	---	---	---	---	---
CbF:								
Caguabo-----	0-6	11-27	---	5.6-7.3	0	0	0	0
	6-13	11-27	---	5.6-7.3	0	0	0	0
	13-19	---	---	---	---	---	---	---
	>19	---	---	---	---	---	---	---
CeA:								
Cartagena-----	0-7	40-60	---	6.6-8.4	0-2	0	4.0-8.0	0-2
	7-15	40-60	---	6.6-8.4	1-15	0	4.0-8.0	0-2
	15-46	30-55	---	6.6-8.4	5-25	0	8.0-16.0	10-20
	46-60	30-40	---	6.6-8.4	5-25	0	8.0-16.0	10-20
CgD:								
Casabe-----	0-7	---	---	6.6-7.3	0	0	0	0
	7-16	---	---	6.6-7.3	0	0	0	0
	16-38	---	---	---	---	---	---	---
	>38	---	---	---	---	---	---	---
CgF:								
Casabe-----	0-7	---	---	6.6-7.3	0	0	0	0
	7-16	---	---	6.6-7.3	0	0	0	0
	16-38	---	---	---	---	---	---	---
	>38	---	---	---	---	---	---	---
ChA:								
Cataño-----	0-8	1.2-3.9	---	7.9-8.4	10-50	0	0	0
	8-11	0.0-3.0	---	7.9-8.4	10-50	0	0	0
	11-72	0.0-3.0	---	7.9-8.4	10-50	0	0	0
CjD:								
Cerro Gordo-----	0-3	---	---	4.5-5.5	0	0	0	0
	3-11	---	0.0-8.0	4.5-5.5	0	0	0	0
	11-81	---	0.0-6.0	4.5-6.5	0	0	0	0
CkD:								
Cerro Mariquita-----	0-2	16-27	---	6.1-8.4	0	0	0	0
	2-13	26-34	---	6.1-8.0	0	0	0	0
	13-23	---	---	---	---	---	---	---
	23-35	---	---	---	---	---	---	---
CkF:								
Cerro Mariquita-----	0-2	16-27	---	6.1-8.4	0	0	0	0
	2-13	26-34	---	6.1-8.0	0	0	0	0
	13-23	---	---	---	---	---	---	---
	23-35	---	---	---	---	---	---	---

Soil Survey of San Germán Area, Puerto Rico

Table 22.--Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction	Calcium carbon- ate	Gypsum	Salinity	Sodium adsorp- tion ratio
	<i>Inches</i>	<i>meq/100 g</i>	<i>meq/100 g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
CmB:								
Coamo-----	0-9	30-40	---	6.1-7.8	0-2	0	0.0-2.0	0-4
	9-23	30-40	---	7.4-8.4	10-20	0	0.0-2.0	0-4
	23-50	20-30	---	7.9-8.4	20-50	0	0.0-2.0	0-4
	50-80	20-30	---	7.9-8.4	20-50	0	0.0-2.0	0-4
CoA:								
Coloso-----	0-11	30-45	---	5.6-8.4	0	0	0	0
	11-31	25-45	---	5.6-8.4	0	0	0	0
	31-90	25-50	---	5.6-8.4	0	0	0	0
CsE:								
Consumo-----	0-5	---	9.0-17	4.5-6.5	0	0	0	0
	5-20	---	9.0-17	4.5-6.5	0	0	0	0
	20-80	---	8.0-19	4.5-6.5	0	0	0	0
CsF:								
Consumo-----	0-5	---	9.0-17	4.5-6.5	0	0	0	0
	5-20	---	9.0-17	4.5-6.5	0	0	0	0
	20-80	---	8.0-19	4.5-6.5	0	0	0	0
CtA:								
Cortada-----	0-6	9.5-31	---	7.4-8.4	0-5	0	0.0-2.0	0-10
	6-15	9.5-31	---	7.4-8.4	0-5	0	0.0-2.0	0-10
	15-23	24-30	---	7.4-8.4	10-20	0	0.0-2.0	0-10
	23-34	24-30	---	7.4-8.4	10-20	0	0.0-2.0	0-10
	34-45	24-30	---	7.4-8.4	10-20	0	0.0-2.0	0-10
	45-56	8.9-27	---	7.4-8.4	10-20	0	0.0-2.0	0-10
	56-63	8.9-27	---	7.4-8.4	10-20	0	0.0-2.0	0-10
	63-80	16-26	---	7.4-8.4	10-20	0	0.0-2.0	0-10
CuD:								
Costa-----	0-7	24-60	---	6.1-9.0	20-40	0	0.0-2.0	0-2
	7-11	20-45	---	6.1-9.0	45-65	0	0.0-1.0	0-2
	11-19	7.2-28	---	6.1-9.0	50-75	0	0.0-1.0	1-5
	19-43	---	---	---	---	---	---	---
	43-63	---	---	---	---	---	---	---
Pitahaya-----	0-2	28-48	---	7.9-8.4	30-50	0	0.0-2.0	0
	2-11	28-46	---	7.9-8.4	50-70	0	0.0-2.0	0-2
	11-27	---	---	---	---	---	---	---
	27-80	---	---	---	---	---	---	---
CuF:								
Costa-----	0-7	24-60	---	6.1-9.0	20-40	0	0.0-2.0	0-2
	7-11	20-45	---	6.1-9.0	45-65	0	0.0-1.0	0-2
	11-19	7.2-28	---	6.1-9.0	50-75	0	0.0-1.0	1-5
	19-43	---	---	---	---	---	---	---
	43-63	---	---	---	---	---	---	---
Pitahaya-----	0-2	28-48	---	7.9-8.4	30-50	0	0.0-2.0	0
	2-11	28-46	---	7.9-8.4	50-70	0	0.0-2.0	0-2
	11-27	---	---	---	---	---	---	---
	27-80	---	---	---	---	---	---	---
CvF:								
Cuchillas-----	0-6	15-22	---	6.1-7.3	0	0	0	0
	6-15	15-32	---	6.1-7.3	0	0	0	0
	15-36	---	---	---	---	---	---	---
	>36	---	---	---	---	---	---	---

Soil Survey of San Germán Area, Puerto Rico

Table 22.--Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction	Calcium carbon- ate	Gypsum	Salinity	Sodium adsorp- tion ratio
	<i>Inches</i>	<i>meq/100 g</i>	<i>meq/100 g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
CvG:								
Cuchillas-----	0-6	15-22	---	6.1-7.3	0	0	0	0
	6-15	15-32	---	6.1-7.3	0	0	0	0
	15-36	---	---	---	---	---	---	---
	>36	---	---	---	---	---	---	---
DeD:								
Delicias-----	0-6	---	2.0-14	4.5-5.5	0	0	0	0
	6-68	---	2.0-10	4.5-5.5	0	0	0	0
DqA:								
Dique-----	0-12	25-38	---	6.6-7.8	0	0	0	0
	12-37	20-25	---	6.6-7.8	0	0	0	0
	37-90	15-20	---	6.6-7.8	0	0	0	0
DsC:								
Descalabrado-----	0-5	30-50	---	6.1-7.3	0	0	0	0
	5-10	20-50	---	6.1-7.3	0	0	0	0
	10-18	---	---	---	---	---	---	---
	>18	---	---	---	---	---	---	---
DsD:								
Descalabrado-----	0-5	30-50	---	6.1-7.3	0	0	0	0
	5-10	20-50	---	6.1-7.3	0	0	0	0
	10-18	---	---	---	---	---	---	---
	>18	---	---	---	---	---	---	---
DsF:								
Descalabrado-----	0-5	30-50	---	6.1-7.3	0	0	0	0
	5-10	20-50	---	6.1-7.3	0	0	0	0
	10-18	---	---	---	---	---	---	---
	>18	---	---	---	---	---	---	---
EcD:								
El Cacique-----	0-6	---	---	6.6-7.3	0	0	0	0
	6-11	---	---	6.6-7.3	0	0	0	0
	11-14	---	---	---	---	---	---	---
	14-86	---	---	---	---	---	---	---
La Taína-----	0-8	---	---	6.6-7.3	0	0	0	0
	8-17	---	---	6.6-7.3	0	0	0	0
	17-29	---	---	---	---	---	---	---
	>29	---	---	---	---	---	---	---
EcF:								
El Cacique-----	0-6	---	---	6.6-7.3	0	0	0	0
	6-11	---	---	6.6-7.3	0	0	0	0
	11-14	---	---	---	---	---	---	---
	14-86	---	---	---	---	---	---	---
La Taína-----	0-8	---	---	6.6-7.3	0	0	0	0
	8-17	---	---	6.6-7.3	0	0	0	0
	17-29	---	---	---	---	---	---	---
	>29	---	---	---	---	---	---	---
EcG:								
El Cacique-----	0-6	---	---	6.6-7.3	0	0	0	0
	6-11	---	---	6.6-7.3	0	0	0	0
	11-14	---	---	---	---	---	---	---
	14-86	---	---	---	---	---	---	---

Soil Survey of San Germán Area, Puerto Rico

Table 22.--Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction	Calcium carbon- ate	Gypsum	Salinity	Sodium adsorp- tion ratio
	<i>Inches</i>	<i>meq/100 g</i>	<i>meq/100 g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
EcG:								
La Taína-----	0-8	---	---	6.6-7.3	0	0	0	0
	8-17	---	---	6.6-7.3	0	0	0	0
	17-29	---	---	---	---	---	---	---
	>29	---	---	---	---	---	---	---
EdD:								
El Descanso-----	0-3	58-88	---	6.1-6.5	0	0	0	0
	3-8	---	---	6.6-7.3	0	0	0	0
	8-15	---	---	6.6-7.3	0	0	0	0
	15-80	---	---	---	0	0	---	---
Hoconuco-----	0-3	---	---	5.1-5.5	0	0	---	0
	3-7	---	---	6.1-6.5	0	0	---	0
	7-14	---	---	6.6-7.3	0	0	---	0
	14-37	---	---	---	---	---	---	---
	37-80	---	---	---	---	---	---	---
EdF:								
El Descanso-----	0-3	58-88	---	6.1-6.5	0	0	0	0
	3-8	---	---	6.6-7.3	0	0	0	0
	8-15	---	---	6.6-7.3	0	0	0	0
	15-80	---	---	---	0	0	---	---
Hoconuco-----	0-3	---	---	5.1-5.5	0	0	---	0
	3-7	---	---	6.1-6.5	0	0	---	0
	7-14	---	---	6.6-7.3	0	0	---	0
	14-37	---	---	---	---	---	---	---
	37-80	---	---	---	---	---	---	---
EdG:								
El Descanso-----	0-3	58-88	---	6.1-6.5	0	0	0	0
	3-8	---	---	6.6-7.3	0	0	0	0
	8-15	---	---	6.6-7.3	0	0	0	0
	15-80	---	---	---	0	0	---	---
Hoconuco-----	0-3	---	---	5.1-5.5	0	0	---	0
	3-7	---	---	6.1-6.5	0	0	---	0
	7-14	---	---	6.6-7.3	0	0	---	0
	14-37	---	---	---	---	---	---	---
	37-80	---	---	---	---	---	---	---
EpC:								
El Papayo-----	0-2	23-33	---	6.1-7.3	0	0	0	0
	2-14	24-46	---	6.1-7.3	0	0	0	0
	14-16	---	---	---	---	---	---	---
	>16	---	---	---	---	---	---	---
EpD:								
El Papayo-----	0-2	23-33	---	6.1-7.3	0	0	0	0
	2-14	24-46	---	6.1-7.3	0	0	0	0
	14-16	---	---	---	---	---	---	---
	>16	---	---	---	---	---	---	---
EpF:								
El Papayo-----	0-2	23-33	---	6.1-7.3	0	0	0	0
	2-14	24-46	---	6.1-7.3	0	0	0	0
	14-16	---	---	---	---	---	---	---
	>16	---	---	---	---	---	---	---

Soil Survey of San Germán Area, Puerto Rico

Table 22.--Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction	Calcium carbon- ate	Gypsum	Salinity	Sodium adsorp- tion ratio
	<i>Inches</i>	<i>meq/100 g</i>	<i>meq/100 g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
FeA:								
Fé-----	0-7	30-60	---	7.4-9.0	0-20	0	4.0-8.0	5-25
	7-17	30-60	---	7.9-9.0	5-20	0	8.0-16.0	20-40
	17-42	30-60	---	7.9-9.0	5-30	0-1	8.0-16.0	20-40
	42-56	30-60	---	7.9-9.0	5-30	0	8.0-16.0	20-40
FrA:								
Fraternidad-----	0-13	35-55	---	7.4-8.4	0-2	0	0.0-2.0	0-2
	13-17	35-55	---	7.4-8.4	0-2	0	0.0-2.0	0-2
	17-65	35-50	---	7.4-8.4	0-4	0-2	0.0-2.0	0-2
FrB:								
Fraternidad-----	0-13	35-55	---	7.4-8.4	0-2	0	0.0-2.0	0-2
	13-17	35-55	---	7.4-8.4	0-2	0	0.0-2.0	0-2
	17-65	35-50	---	7.4-8.4	0-4	0-2	0.0-2.0	0-2
GbF:								
Guanábano-----	0-2	30-40	---	6.0-8.4	10-30	0	0.0-2.0	0-4
	2-6	30-40	---	6.0-8.4	10-30	0	0.0-2.0	0-4
	6-13	30-40	---	6.0-8.4	30-50	0	0.0-2.0	0-4
	13-21	30-40	---	6.5-8.4	10-30	0	0.0-2.0	0-4
	21-80	30-40	---	6.5-8.4	10-30	0	0.0-2.0	0-4
GhC:								
Guanajibo-----	0-10	---	5.0-7.0	4.5-5.5	0	0	0	0
	10-21	---	4.0-5.0	4.5-5.5	0	0	0	0
	21-63	---	4.0-5.0	4.5-5.5	0	0	0	0
GnA:								
Guánica-----	0-4	40-70	---	7.4-8.4	0-15	0	1.0-8.0	2-10
	4-12	40-70	---	7.4-8.4	0-15	0	1.0-8.0	2-10
	12-52	40-60	---	7.4-8.4	0-15	0	4.0-10.0	15-20
	52-79	40-60	---	7.4-8.4	0-15	0-4	8.0-16.0	20-30
GuB:								
Guayabo-----	0-7	1.0-5.0	---	6.1-6.5	0-1	0	0.0-2.0	0-2
	7-55	0.0-5.0	---	6.1-6.5	0-1	0	0.0-2.0	0-2
	55-65	0.0-5.0	---	6.6-7.3	0-1	0	0.0-2.0	0-2
	65-75	0.0-5.0	---	6.6-7.3	0-1	0	0.0-2.0	0-2
GyB:								
Guayacán-----	0-8	35-40	---	7.9-8.4	0-15	0	0.0-1.0	0
	8-12	35-40	---	7.9-8.4	0-20	0	---	0
	12-26	10-40	---	7.9-8.4	0-25	0	---	0
	26-45	7.6-30	---	7.9-9.0	20-35	0	---	0
	45-59	10-40	---	7.9-9.0	15-95	0	---	0-5
	59-76	10-40	---	7.9-9.0	15-95	0	---	0-10
	76-91	10-40	---	7.9-9.0	15-95	0	---	0-12
GyC:								
Guayacán-----	0-8	35-40	---	7.9-8.4	0-15	0	0.0-1.0	0
	8-12	35-40	---	7.9-8.4	0-20	0	---	0
	12-26	10-40	---	7.9-8.4	0-25	0	---	0
	26-45	7.6-30	---	7.9-9.0	20-35	0	---	0
	45-59	10-40	---	7.9-9.0	15-95	0	---	0-5
	59-76	10-40	---	7.9-9.0	15-95	0	---	0-10
	76-91	10-40	---	7.9-9.0	15-95	0	---	0-12

Soil Survey of San Germán Area, Puerto Rico

Table 22.--Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction	Calcium carbon- ate	Gypsum	Salinity	Sodium adsorp- tion ratio
	<i>Inches</i>	<i>meq/100 g</i>	<i>meq/100 g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
GyD:								
Guayacán-----	0-8	35-40	---	7.9-8.4	0-15	0	0.0-1.0	0
	8-12	35-40	---	7.9-8.4	0-20	0	---	0
	12-26	10-40	---	7.9-8.4	0-25	0	---	0
	26-45	7.6-30	---	7.9-9.0	20-35	0	---	0
	45-59	10-40	---	7.9-9.0	15-95	0	---	0-5
	59-76	10-40	---	7.9-9.0	15-95	0	---	0-10
	76-91	10-40	---	7.9-9.0	15-95	0	---	0-12
HmD:								
Humatas-----	0-5	---	9.0-17	4.0-5.5	0	0	0	0
	5-32	---	3.0-14	4.0-5.5	0	0	0	0
	32-44	---	3.0-14	4.0-5.5	0	0	0	0
	44-65	---	3.0-17	4.0-5.5	0	0	0	0
HmE:								
Humatas-----	0-5	---	9.0-17	4.0-5.5	0	0	0	0
	5-32	---	3.0-14	4.0-5.5	0	0	0	0
	32-44	---	3.0-14	4.0-5.5	0	0	0	0
	44-65	---	3.0-17	4.0-5.5	0	0	0	0
HmF:								
Humatas-----	0-5	---	9.0-17	4.0-5.5	0	0	0	0
	5-32	---	3.0-14	4.0-5.5	0	0	0	0
	32-44	---	3.0-14	4.0-5.5	0	0	0	0
	44-65	---	3.0-17	4.0-5.5	0	0	0	0
JaB:								
Jácana-----	0-20	30-50	---	7.4-8.4	0-1	0	0.0-2.0	0
	20-30	30-50	---	7.4-8.4	0-1	0	0.0-2.0	0
	30-33	30-50	---	7.4-8.4	0-1	0	0.0-2.0	0
	>33	---	---	---	---	---	---	---
JaC:								
Jácana-----	0-20	30-50	---	7.4-8.4	0-1	0	0.0-2.0	0
	20-30	30-50	---	7.4-8.4	0-1	0	0.0-2.0	0
	30-33	30-50	---	7.4-8.4	0-1	0	0.0-2.0	0
	>33	---	---	---	---	---	---	---
JBA:								
Joyuda-----	0-4	56-114	---	6.6-8.4	0	0	---	0
	4-80	56-114	---	6.6-8.4	0	0	---	0
Atolladero-----	0-2	14-37	---	7.9-8.4	---	0	4.0-8.0	0
	2-32	6.5-24	---	7.9-8.4	10-50	0	8.0-16.0	0
	32-60	0.0-13	---	7.9-8.4	10-50	0	16.0-32.0	0
Bajura-----	0-4	30-40	---	5.6-8.4	0	0	0	0
	4-16	25-35	---	5.6-8.4	0	0	0	0
	16-42	25-35	---	5.6-8.4	0	0	0	0
	42-80	25-35	---	5.6-8.4	0	0	0	0
LcE:								
La Covana-----	0-5	55-70	---	7.4-8.4	30-40	0	0.0-2.0	0
	5-19	15-25	---	7.9-8.4	50-60	0	0.0-2.0	0
	19-31	---	---	---	---	---	---	---
	31-80	0.0-5.0	---	7.9-8.4	85-95	0	0.0-2.0	0
Limestone outcrop.								

Soil Survey of San Germán Area, Puerto Rico

Table 22.--Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction	Calcium carbon- ate	Gypsum	Salinity	Sodium adsorp- tion ratio
	<i>Inches</i>	<i>meq/100 g</i>	<i>meq/100 g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
LcE: Seboruco-----	0-2	---	---	7.9-8.4	20-40	0	0.0-2.0	0-4
	2-7	---	---	7.9-8.4	20-40	0	0.0-2.0	0-4
	7-11	---	---	7.9-8.4	20-40	0	0.0-2.0	0-4
	11-19	---	---	7.9-8.4	70-90	0	0.0-2.0	0-4
	19-26	---	---	7.9-8.4	70-90	0	0.0-2.0	0-4
	26-31	---	---	7.9-8.0	70-90	0	0.0-2.0	0-4
	>31	---	---	---	---	---	---	---
LdA: La Luna-----	0-11	30-50	---	7.4-7.8	0-5	0	0.0-2.0	0-10
	11-20	30-50	---	7.4-7.8	0-5	0	0.0-2.0	0-10
	20-58	30-50	---	7.9-8.4	5-10	0	0.0-2.0	0-10
	58-75	40-60	---	7.9-8.4	10-20	0	0.0-2.0	0-10
LeF: La Tea-----	0-5	55-65	---	6.6-8.4	0-2	0	0.0-2.0	0
	5-11	45-55	---	6.6-8.4	0-2	0	0.0-2.0	0
	11-16	45-55	---	6.6-8.4	0-2	0	---	0
	16-18	---	---	---	---	---	---	---
	18-40	---	---	---	---	---	---	---
LfC: Landfill.								
LkB: Lares-----	0-2	---	15-20	4.5-5.5	0	0	0	0
	2-5	---	20-29	4.5-5.5	0	0	0	0
	5-28	---	20-30	4.5-6.5	0	0	0	0
	28-43	---	19-22	4.5-6.5	0	0	0	0
	43-83	---	20-31	4.5-6.5	0	0	0	0
LnA: Llanos Costa-----	0-9	5.5-15	---	5.1-7.3	0	0	0	0
	9-15	11-20	---	5.1-7.3	0	0	0	0
	15-43	11-20	---	5.1-7.3	0	0	0	0
	43-78	5.0-15	5.5-8.8	5.1-7.3	0	0	0	0
LnB: Llanos Costa-----	0-9	5.5-15	---	5.1-7.3	0	0	0	0
	9-15	11-20	---	5.1-7.3	0	0	0	0
	15-43	11-20	---	5.1-7.3	0	0	0	0
	43-78	5.0-15	5.5-8.8	5.1-7.3	0	0	0	0
LnC: Llanos Costa-----	0-9	5.5-15	---	5.1-7.3	0	0	0	0
	9-15	11-20	---	5.1-7.3	0	0	0	0
	15-43	11-20	---	5.1-7.3	0	0	0	0
	43-78	5.0-15	5.5-8.8	5.1-7.3	0	0	0	0
LpG: Los Penones-----	0-8	---	---	7.9-8.4	0	0	---	0
	>8	---	---	---	---	---	---	---
Limestone outcrop.								
MaB: Mabí-----	0-7	25-35	---	5.1-7.3	0	0	0	0
	7-50	35-42	---	5.6-7.8	0	0	0	0
	50-74	30-41	---	6.1-8.4	0	0	0	0

Soil Survey of San Germán Area, Puerto Rico

Table 22.--Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction	Calcium carbon- ate	Gypsum	Salinity	Sodium adsorp- tion ratio
	<i>Inches</i>	<i>meq/100 g</i>	<i>meq/100 g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
MbA:								
Maguayo-----	0-6	10-30	---	5.6-7.8	0	0	0	0
	6-12	10-30	---	5.6-7.8	0	0	0	0
	12-35	10-35	---	6.1-8.4	0	0	0	0
	35-65	10-35	---	6.1-8.4	10-15	0	0	0
MbC:								
Maguayo-----	0-6	10-30	---	5.6-7.8	0	0	0	0
	6-12	10-30	---	5.6-7.8	0	0	0	0
	12-35	10-35	---	6.1-8.4	0	0	0	0
	35-65	10-35	---	6.1-8.4	10-15	0	0	0
McF:								
Malaya-----	0-4	---	---	6.1-7.9	0	0	0	0
	4-10	---	---	6.6-8.4	0	0	0	0
	10-72	---	---	---	---	---	---	---
MDA:								
Manglillo-----	0-5	56-114	---	7.9-8.4	0	0	0	0
	5-24	56-114	---	7.9-8.4	0	0	0	0
	24-43	12-27	---	7.9-8.4	0	0	0	0
	43-60	0.0-23	---	7.9-8.4	0	0	0	0
Boquerón-----	0-2	124-174	---	7.4-7.8	0	0	0	0
	2-4	25-45	---	6.6-7.8	0	0	0	0
	4-8	25-45	---	6.6-7.8	0	0	0	0
	8-55	25-45	---	6.6-7.8	0	0	0	0
	55-79	33-55	---	6.6-7.8	0	0	0	0
Serrano-----	0-3	10-30	---	7.9-8.4	0	0	4.0-8.0	5-15
	3-14	20-40	---	7.9-8.4	0	0	8.0-16.0	20-40
	14-65	5.0-10	---	7.9-8.4	0	0	8.0-16.0	20-40
MeA:								
Maní-----	0-13	20-23	---	5.6-6.5	0	0	0	0
	13-41	19-25	---	5.6-6.5	0	0	0	0
	41-90	32-44	---	7.9-8.4	0	0	0	0
MfF:								
Maresúa-----	0-1	30-80	---	6.6-7.3	---	0	0.0-3.0	0-1
	1-4	30-40	---	6.6-7.3	0	0	0.0-2.0	0
	4-10	30-40	---	6.6-7.3	0	0	0	0
	10-26	30-40	---	6.6-7.3	0	0	0	0
	26-46	---	---	---	---	---	---	---
	>46	---	---	---	---	---	---	---
MgF:								
Maresúa-----	0-1	30-80	---	6.6-7.3	---	0	0.0-3.0	0-1
	1-4	30-40	---	6.6-7.3	0	0	0.0-2.0	0
	4-10	30-40	---	6.6-7.3	0	0	0	0
	10-26	30-40	---	6.6-7.3	0	0	0	0
	26-46	---	---	---	---	---	---	---
	>46	---	---	---	---	---	---	---
Serpentinite outcrop.								

Soil Survey of San Germán Area, Puerto Rico

Table 22.--Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction	Calcium carbon- ate	Gypsum	Salinity	Sodium adsorp- tion ratio
	Inches	meq/100 g	meq/100 g	pH	Pct	Pct	mmhos/cm	
MiD:								
Mariana-----	0-8	---	---	3.5-5.0	0-2	0	0	0
	8-15	---	---	3.5-5.0	0-2	0	0	0
	15-32	---	---	3.5-5.5	0-2	0	0	0
	32-49	---	---	3.5-5.5	0-2	0	0	0
	49-59	---	---	3.5-5.5	0-2	0	0	0
MiE:								
Mariana-----	0-8	---	---	3.5-5.0	0-2	0	0	0
	8-15	---	---	3.5-5.0	0-2	0	0	0
	15-32	---	---	3.5-5.5	0-2	0	0	0
	32-49	---	---	3.5-5.5	0-2	0	0	0
	49-59	---	---	3.5-5.5	0-2	0	0	0
MkF:								
Maricao-----	0-5	10-23	10-20	3.5-5.0	0	0	0.0-0.2	0
	5-11	10-20	8.0-12	4.5-5.1	0	0	0	0
	11-29	10-20	7.0-12	4.5-5.0	0	0	0	0
	29-46	10-20	8.0-12	4.5-5.0	0	0	0	0
	46-63	10-20	12-20	4.5-5.0	0	0	0	0
MkG:								
Maricao-----	0-5	10-23	10-20	3.5-5.0	0	0	0.0-0.2	0
	5-11	10-20	8.0-12	4.5-5.1	0	0	0	0
	11-29	10-20	7.0-12	4.5-5.0	0	0	0	0
	29-46	10-20	8.0-12	4.5-5.0	0	0	0	0
	46-63	10-20	12-20	4.5-5.0	0	0	0	0
MnA:								
Melones-----	0-7	27-51	---	7.4-8.4	0-5	0	0.0-2.0	0-13
	7-18	27-44	---	7.9-8.4	0-5	0	0.0-2.0	0-13
	18-46	25-44	---	7.9-8.4	5-15	0	4.0-8.0	13-30
	46-66	25-44	---	7.9-8.4	5-15	0	8.0-16.0	13-30
	66-70	25-44	---	7.9-8.4	5-15	0	8.0-16.0	13-35
	70-79	25-44	---	7.9-8.4	20-30	0	8.0-16.0	13-30
MnC:								
Melones-----	0-7	27-51	---	7.4-8.4	0-5	0	0.0-2.0	0-13
	7-18	27-44	---	7.9-8.4	0-5	0	0.0-2.0	0-13
	18-46	25-44	---	7.9-8.4	5-15	0	4.0-8.0	13-30
	46-66	25-44	---	7.9-8.4	5-15	0	8.0-16.0	13-30
	66-70	25-44	---	7.9-8.4	5-15	0	8.0-16.0	13-35
	70-79	25-44	---	7.9-8.4	20-30	0	8.0-16.0	13-30
MoB:								
Montalva-----	0-6	28-44	---	6.6-7.8	0-1	0	0.0-2.0	0
	6-16	34-42	---	6.6-7.8	0-1	0	0.0-2.0	0
	16-29	34-42	---	6.6-7.8	0-1	0	0.0-2.0	0
	29-32	23-34	---	6.6-7.8	0-1	0	0.0-2.0	0
	32-40	---	---	---	---	---	---	---
MoC:								
Montalva-----	0-6	28-44	---	6.6-7.8	0-1	0	0.0-2.0	0
	6-16	34-42	---	6.6-7.8	0-1	0	0.0-2.0	0
	16-29	34-42	---	6.6-7.8	0-1	0	0.0-2.0	0
	29-32	23-34	---	6.6-7.8	0-1	0	0.0-2.0	0
	32-40	---	---	---	---	---	---	---

Soil Survey of San Germán Area, Puerto Rico

Table 22.--Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction	Calcium carbon- ate	Gypsum	Salinity	Sodium adsorp- tion ratio
	<i>Inches</i>	<i>meq/100 g</i>	<i>meq/100 g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
MqC:								
Montegrando-----	0-6	30-45	---	5.1-8.4	0	0	0	0
	6-10	30-45	---	5.1-8.4	0	0	0	0
	10-24	40-45	---	5.1-8.4	0	0	0	0
	24-65	41-45	---	7.9-8.4	0	0	0	0
MrD:								
Morado-----	0-5	48-63	---	5.6-7.3	0	0	0	0
	5-16	48-60	---	5.6-7.3	0	0	0	0
	16-21	45-53	---	5.6-7.3	0	0	0	0
	21-31	---	---	---	---	---	---	---
	31-80	---	---	---	---	---	---	---
MrE:								
Morado-----	0-5	48-63	---	5.6-7.3	0	0	0	0
	5-16	48-60	---	5.6-7.3	0	0	0	0
	16-21	45-53	---	5.6-7.3	0	0	0	0
	21-31	---	---	---	---	---	---	---
	31-80	---	---	---	---	---	---	---
MrF:								
Morado-----	0-5	48-63	---	5.6-7.3	0	0	0	0
	5-16	48-60	---	5.6-7.3	0	0	0	0
	16-21	45-53	---	5.6-7.3	0	0	0	0
	21-31	---	---	---	---	---	---	---
	31-80	---	---	---	---	---	---	---
MuC:								
Múcara-----	0-5	17-40	---	5.1-7.8	0	0	0	0
	5-18	30-40	---	5.1-7.8	0	0	0	0
	18-32	30-40	---	5.1-7.8	0	0	0	0
	>32	---	---	---	---	---	---	---
MuD:								
Múcara-----	0-5	17-40	---	5.1-7.8	0	0	0	0
	5-18	30-40	---	5.1-7.8	0	0	0	0
	18-32	30-40	---	5.1-7.8	0	0	0	0
	>32	---	---	---	---	---	---	---
MuE:								
Múcara-----	0-5	17-40	---	5.1-7.8	0	0	0	0
	5-18	30-40	---	5.1-7.8	0	0	0	0
	18-32	30-40	---	5.1-7.8	0	0	0	0
	>32	---	---	---	---	---	---	---
MuF:								
Múcara-----	0-5	17-40	---	5.1-7.8	0	0	0	0
	5-18	30-40	---	5.1-7.8	0	0	0	0
	18-32	30-40	---	5.1-7.8	0	0	0	0
	>32	---	---	---	---	---	---	---
NpD:								
Nipe-----	0-2	---	0.0-1.0	4.5-6.0	---	0	0	0
	2-7	---	0.0-8.0	4.5-6.0	0	0	0	0
	7-11	---	0.0-6.0	4.5-6.0	0	0	0	0
	11-60	---	0.0-6.0	4.5-6.0	0	0	0	0

Soil Survey of San Germán Area, Puerto Rico

Table 22.--Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction	Calcium carbon- ate	Gypsum	Salinity	Sodium adsorp- tion ratio
	<i>Inches</i>	<i>meq/100 g</i>	<i>meq/100 g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
OrA:								
Olivares-----	0-2	1.1-149	---	6.1-8.4	0	0	---	0
	2-25	33-45	---	7.9-8.4	0	0	---	0
	25-48	32-44	---	7.9-8.4	0	0	---	0
	48-80	31-42	---	7.9-8.4	0	0	---	0
PaA:								
Palmarejo-----	0-9	10-30	6.0-15	3.5-5.0	0	0	0.0-2.0	0
	9-30	10-30	12-20	3.5-5.0	0	0	0.0-2.0	0
	30-41	10-30	12-30	3.5-5.0	0	0	0.0-2.0	0
	41-51	10-30	12-30	3.5-5.0	0	0	0.0-2.0	0
PaB:								
Palmarejo-----	0-9	10-30	6.0-15	3.5-5.0	0	0	0.0-2.0	0
	9-30	10-30	12-20	3.5-5.0	0	0	0.0-2.0	0
	30-41	10-30	12-30	3.5-5.0	0	0	0.0-2.0	0
	41-51	10-30	12-30	3.5-5.0	0	0	0.0-2.0	0
PaC:								
Palmarejo-----	0-9	10-30	6.0-15	3.5-5.0	0	0	0.0-2.0	0
	9-30	10-30	12-20	3.5-5.0	0	0	0.0-2.0	0
	30-41	10-30	12-30	3.5-5.0	0	0	0.0-2.0	0
	41-51	10-30	12-30	3.5-5.0	0	0	0.0-2.0	0
PgA:								
Parguera-----	0-7	35-50	---	7.4-8.4	10-15	0	0.0-2.0	0-2
	7-22	35-40	---	7.4-8.4	10-15	0	0.0-2.0	0-2
	22-39	25-30	---	7.4-8.4	20-30	0	0.0-2.0	0-2
	39-57	15-20	---	7.4-8.5	50-60	0	0.0-2.0	0-2
	57-79	30-35	---	7.4-8.4	20-30	0	0.0-2.0	15-20
PgB:								
Parguera-----	0-7	35-50	---	7.4-8.4	10-15	0	0.0-2.0	0-2
	7-22	35-40	---	7.4-8.4	10-15	0	0.0-2.0	0-2
	22-39	25-30	---	7.4-8.4	20-30	0	0.0-2.0	0-2
	39-57	15-20	---	7.4-8.5	50-60	0	0.0-2.0	0-2
	57-79	30-35	---	7.4-8.4	20-30	0	0.0-2.0	15-20
PsF:								
Pitahaya-----	0-2	28-48	---	7.9-8.4	30-50	0	0.0-2.0	0
	2-11	28-46	---	7.9-8.4	50-70	0	0.0-2.0	0-2
	11-27	---	---	---	---	---	---	---
	27-80	---	---	---	---	---	---	---
Limestone outcrop.								
Seboruco-----	0-2	---	---	7.9-8.4	20-40	0	0.0-2.0	0-4
	2-7	---	---	7.9-8.4	20-40	0	0.0-2.0	0-4
	7-11	---	---	7.9-8.4	20-40	0	0.0-2.0	0-4
	11-19	---	---	7.9-8.4	70-90	0	0.0-2.0	0-4
	19-26	---	---	7.9-8.4	70-90	0	0.0-2.0	0-4
	26-31	---	---	7.9-8.0	70-90	0	0.0-2.0	0-4
	>31	---	---	---	---	---	---	---
PsG:								
Pitahaya-----	0-2	28-48	---	7.9-8.4	30-50	0	0.0-2.0	0
	2-11	28-46	---	7.9-8.4	50-70	0	0.0-2.0	0-2
	11-27	---	---	---	---	---	---	---
	27-80	---	---	---	---	---	---	---

Soil Survey of San Germán Area, Puerto Rico

Table 22.--Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction	Calcium carbon- ate	Gypsum	Salinity	Sodium adsorp- tion ratio
	<i>Inches</i>	<i>meq/100 g</i>	<i>meq/100 g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
PsG: Limestone outcrop.								
Seboruco-----	0-2	---	---	7.9-8.4	20-40	0	0.0-2.0	0-4
	2-7	---	---	7.9-8.4	20-40	0	0.0-2.0	0-4
	7-11	---	---	7.9-8.4	20-40	0	0.0-2.0	0-4
	11-19	---	---	7.9-8.4	70-90	0	0.0-2.0	0-4
	19-26	---	---	7.9-8.4	70-90	0	0.0-2.0	0-4
	26-31	---	---	7.9-8.0	70-90	0	0.0-2.0	0-4
	>31	---	---	---	---	---	---	---
Pt: Pits and quarries.								
PzB: Pozo Blanco-----	0-7	20-40	---	7.4-8.4	2-15	0	0.0-1.0	0-2
	7-22	20-40	---	7.4-8.4	2-15	0	0.0-1.0	0-2
	22-30	10-40	---	7.4-8.4	15-35	0	1.0-2.0	0-10
	30-60	10-40	---	7.4-8.4	20-93	0	1.0-4.0	0-12
PzC: Pozo Blanco-----	0-7	20-40	---	7.4-8.4	2-15	0	0.0-1.0	0-2
	7-22	20-40	---	7.4-8.4	2-15	0	0.0-1.0	0-2
	22-30	10-40	---	7.4-8.4	15-35	0	1.0-2.0	0-10
	30-60	10-40	---	7.4-8.4	20-93	0	1.0-4.0	0-12
PzD: Pozo Blanco-----	0-7	20-40	---	7.4-8.4	2-15	0	0.0-1.0	0-2
	7-22	20-40	---	7.4-8.4	2-15	0	0.0-1.0	0-2
	22-30	10-40	---	7.4-8.4	15-35	0	1.0-2.0	0-10
	30-60	10-40	---	7.4-8.4	20-93	0	1.0-4.0	0-12
Qbd: Quebrada-----	0-2	27-38	---	6.1-7.3	0	0	0	0
	2-19	25-30	---	6.1-7.3	0	0	0	0
	19-60	---	---	---	---	---	---	---
QbE: Quebrada-----	0-2	27-38	---	6.1-7.3	0	0	0	0
	2-19	25-30	---	6.1-7.3	0	0	0	0
	19-60	---	---	---	---	---	---	---
QbF: Quebrada-----	0-2	27-38	---	6.1-7.3	0	0	0	0
	2-19	25-30	---	6.1-7.3	0	0	0	0
	19-60	---	---	---	---	---	---	---
ReA: Reilly-----	0-4	20-25	---	6.6-8.4	0	0	0	0
	4-17	1.0-10	---	6.6-8.4	0	0	0	0
	17-75	1.0-10	---	6.6-8.4	0	0	0	0
RoD: Rosario-----	0-2	240-250	0.0-0.0	5.0-6.5	---	0	0	0
	2-6	5.0-16	10-16	4.5-6.1	0	0	0	0
	6-32	2.0-10	3.0-10	4.5-6.1	0	0	0	0
	32-44	---	---	---	---	---	---	---
	>44	---	---	---	---	---	---	---

Soil Survey of San Germán Area, Puerto Rico

Table 22.--Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction	Calcium carbon- ate	Gypsum	Salinity	Sodium adsorp- tion ratio
	<i>Inches</i>	<i>meq/100 g</i>	<i>meq/100 g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
RoE: Rosario-----	0-2	240-250	0.0-0.0	5.0-6.5	---	0	0	0
	2-6	5.0-16	10-16	4.5-6.1	0	0	0	0
	6-32	2.0-10	3.0-10	4.5-6.1	0	0	0	0
	32-44	---	---	---	---	---	---	---
	>44	---	---	---	---	---	---	---
RoF: Rosario-----	0-2	240-250	0.0-0.0	5.0-6.5	---	0	0	0
	2-6	5.0-16	10-16	4.5-6.1	0	0	0	0
	6-32	2.0-10	3.0-10	4.5-6.1	0	0	0	0
	32-44	---	---	---	---	---	---	---
	>44	---	---	---	---	---	---	---
RuF: Rubias-----	0-8	15-21	---	6.1-7.3	0	0	---	0
	8-18	16-21	---	6.1-7.3	0	0	---	0
	18-25	5.4-15	---	6.1-7.3	0	0	---	0
	25-50	---	---	---	---	---	---	---
	>50	---	---	---	---	---	---	---
Chiquito-----	0-5	---	---	5.6-7.3	0	0	0	0
	5-18	---	---	5.6-7.3	0	0	0	0
	>18	---	---	---	---	---	---	---
RuG: Rubias-----	0-8	15-21	---	6.1-7.3	0	0	---	0
	8-18	16-21	---	6.1-7.3	0	0	---	0
	18-25	5.4-15	---	6.1-7.3	0	0	---	0
	25-50	---	---	---	---	---	---	---
	>50	---	---	---	---	---	---	---
Chiquito-----	0-5	---	---	5.6-7.3	0	0	0	0
	5-18	---	---	5.6-7.3	0	0	0	0
	>18	---	---	---	---	---	---	---
Sa: Salt flats, ponded.								
Sb: Salt pits.								
ScA: San Anton-----	0-8	20-50	---	6.6-8.4	0-1	0	0.0-2.0	0-2
	8-13	25-50	---	6.6-8.4	0-1	0	0.0-2.0	0-2
	13-24	20-50	---	6.6-8.4	0-1	0	0.0-2.0	0-2
	24-31	20-50	---	6.6-8.4	0-1	0	0.0-2.0	0-2
	31-41	20-40	---	6.6-8.4	0-1	0	0.0-2.0	0-2
	41-54	20-40	---	6.6-8.4	0-1	0	0.0-2.0	0-2
	54-70	20-40	---	6.6-8.4	0	0	0.0-2.0	0-2
SdD: San Germán-----	0-4	25-40	---	7.4-8.4	20-40	0	0.0-2.0	0
	4-10	24-40	---	7.4-8.4	40-80	0	0.0-2.0	0
	10-60	---	---	---	---	---	---	---
SdF: San Germán-----	0-4	25-40	---	7.4-8.4	20-40	0	0.0-2.0	0
	4-10	24-40	---	7.4-8.4	40-80	0	0.0-2.0	0
	10-60	---	---	---	---	---	---	---

Soil Survey of San Germán Area, Puerto Rico

Table 22.--Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction	Calcium carbon- ate	Gypsum	Salinity	Sodium adsorp- tion ratio
	<i>Inches</i>	<i>meq/100 g</i>	<i>meq/100 g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
SgD:								
San Germán-----	0-4	25-40	---	7.4-8.4	20-40	0	0.0-2.0	0
	4-10	24-40	---	7.4-8.4	40-80	0	0.0-2.0	0
	10-60	---	---	---	---	---	---	---
Duey-----	0-13	25-40	---	6.6-8.4	20-40	0	0.0-2.0	0-2
	13-17	24-47	---	6.6-8.4	40-80	0	0.0-2.0	0-2
	17-35	---	---	---	---	---	---	0
	35-80	---	---	---	---	---	---	---
SgF:								
San Germán-----	0-4	25-40	---	7.4-8.4	20-40	0	0.0-2.0	0
	4-10	24-40	---	7.4-8.4	40-80	0	0.0-2.0	0
	10-60	---	---	---	---	---	---	---
Duey-----	0-13	25-40	---	6.6-8.4	20-40	0	0.0-2.0	0-2
	13-17	24-47	---	6.6-8.4	40-80	0	0.0-2.0	0-2
	17-35	---	---	---	---	---	---	0
	35-80	---	---	---	---	---	---	---
SiA:								
Santa Isabel-----	0-10	30-60	---	6.6-7.8	0-5	0	0.0-2.0	0-2
	10-63	30-65	---	6.6-7.8	0-5	0	0.0-2.0	0-2
	63-69	30-65	---	6.6-7.8	0-5	0	0.0-2.0	0-2
SmE:								
Santa Marta-----	0-8	55-60	---	5.1-6.9	0	0	0	0
	8-21	55-60	---	5.1-6.6	0	0	0	0
	21-37	55-60	---	5.1-6.6	0	0	0	0
	37-57	---	---	---	---	---	---	---
	57-64	---	---	---	---	---	---	---
SoC:								
Seboruco-----	0-2	---	---	7.9-8.4	20-40	0	0.0-2.0	0-4
	2-7	---	---	7.9-8.4	20-40	0	0.0-2.0	0-4
	7-11	---	---	7.9-8.4	20-40	0	0.0-2.0	0-4
	11-19	---	---	7.9-8.4	70-90	0	0.0-2.0	0-4
	19-26	---	---	7.9-8.4	70-90	0	0.0-2.0	0-4
	26-31	---	---	7.9-8.0	70-90	0	0.0-2.0	0-4
	>31	---	---	---	---	---	---	---
SsB:								
Sosa-----	0-5	5.0-20	---	5.6-6.5	0-2	0	0.0-2.0	0-2
	5-12	5.0-20	---	5.6-6.5	0-2	0	0.0-2.0	0-2
	12-20	5.0-20	---	6.6-7.3	0-2	0	0.0-2.0	0-2
	20-33	2.0-15	---	6.6-7.3	0-2	0	0.0-2.0	0-2
	33-63	2.0-15	---	6.6-7.3	0-2	0	0.0-2.0	0-2
SsC:								
Sosa-----	0-5	5.0-20	---	5.6-6.5	0-2	0	0.0-2.0	0-2
	5-12	5.0-20	---	5.6-6.5	0-2	0	0.0-2.0	0-2
	12-20	5.0-20	---	6.6-7.3	0-2	0	0.0-2.0	0-2
	20-33	2.0-15	---	6.6-7.3	0-2	0	0.0-2.0	0-2
	33-63	2.0-15	---	6.6-7.3	0-2	0	0.0-2.0	0-2
TeA:								
Teresa-----	0-10	44-53	---	7.4-9.0	0-2	0	0.0-18.0	0-30
	10-38	44-53	---	7.4-9.0	0-2	0	6.0-18.0	0-30
	38-44	44-53	---	7.4-9.0	0-2	0	8.0-18.0	0-30
	44-78	44-53	---	7.4-9.0	1-3	0	8.0-18.0	0-30
	78-85	44-53	---	7.4-9.0	1-3	0	8.0-18.0	0-30

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Table 22.--Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation exchange capacity	Effective cation exchange capacity	Soil reaction	Calcium carbon- ate	Gypsum	Salinity	Sodium adsorp- tion ratio
	Inches	meq/100 g	meq/100 g	pH	Pct	Pct	mmhos/cm	
TfA:								
Teresa, ponded-----	0-10	44-53	---	7.4-9.0	0-2	0	0.0-18.0	0-30
	10-38	44-53	---	7.4-9.0	0-2	0	6.0-18.0	0-30
	38-44	44-53	---	7.4-9.0	0-2	0	8.0-18.0	0-30
	44-78	44-53	---	7.4-9.0	1-3	0	8.0-18.0	0-30
	78-85	44-53	---	7.4-9.0	1-3	0	8.0-18.0	0-30
ToA:								
Toa-----	0-8	23-27	---	5.1-7.3	0	0	0	0
	8-17	23-27	---	5.1-7.3	0	0	0	0
	17-43	23-27	---	5.6-7.8	0	0	0	0
	43-64	20-30	---	5.6-7.8	0	0	0	0
Ua:								
Urban land.								
Ubb:								
Urban land.								
Bahía-----	0-6	1.0-2.0	---	5.1-6.0	0-1	0	0.0-2.0	0-2
	6-45	1.0-2.0	---	5.6-6.5	0-1	0	0.0-2.0	0-2
	45-66	1.0-3.0	---	6.1-7.3	0-1	0	0.0-2.0	0-2
UgB:								
Urban land.								
Guayabo-----	0-7	1.0-5.0	---	6.1-6.5	0-1	0	0.0-2.0	0-2
	7-55	0.0-5.0	---	6.1-6.5	0-1	0	0.0-2.0	0-2
	55-65	0.0-5.0	---	6.6-7.3	0-1	0	0.0-2.0	0-2
	65-75	0.0-5.0	---	6.6-7.3	0-1	0	0.0-2.0	0-2
UsC:								
Urban land.								
Sosa-----	0-5	5.0-20	---	5.6-6.5	0-2	0	0.0-2.0	0-2
	5-12	5.0-20	---	5.6-6.5	0-2	0	0.0-2.0	0-2
	12-20	5.0-20	---	6.6-7.3	0-2	0	0.0-2.0	0-2
	20-33	2.0-15	---	6.6-7.3	0-2	0	0.0-2.0	0-2
	33-63	2.0-15	---	6.6-7.3	0-2	0	0.0-2.0	0-2
VaA:								
Vayas-----	0-5	25-40	---	6.6-8.4	0-2	0	0.0-2.0	2-10
	5-12	25-40	---	6.6-8.4	1-5	0	0.0-2.0	2-10
	12-23	25-40	---	6.6-8.4	1-5	0	0.0-2.0	2-10
	23-62	25-40	---	6.6-8.4	0-5	0	0.0-2.0	2-10
VoC:								
Voladora-----	0-2	---	19-24	3.5-5.5	0	0	0	0
	2-15	---	19-30	3.5-5.5	0	0	0	0
	15-48	---	19-30	3.5-4.5	0	0	0	0
	48-60	---	19-24	3.5-5.5	0	0	0	0
VoD:								
Voladora-----	0-2	---	19-24	3.5-5.5	0	0	0	0
	2-15	---	19-30	3.5-5.5	0	0	0	0
	15-48	---	19-30	3.5-4.5	0	0	0	0
	48-60	---	19-24	3.5-5.5	0	0	0	0
W:								
Water.								

Table 23.--Soil Features

[See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		<i>In</i>	<i>In</i>		<i>In</i>	<i>In</i>			
AbF: Agüeybaná-----	---	---	---	---	0	---	None	High	High
AgD: Aguilita-----	Paralithic bedrock	40-60	20-40	Noncemented	0	---	None	Moderate	Low
AgF: Aguilita-----	Paralithic bedrock	40-60	20-40	Noncemented	0	---	None	Moderate	Low
AkA: Aguirre-----	---	---	---	---	0	---	None	High	Low
AlF: Aljibe-----	Paralithic bedrock	25-40	25-40	Moderately cemented	---	---	None	High	High
	Lithic bedrock	36-60	---	Strongly cemented					
Guamá-----	---	---	---	---	---	---	None	High	High
Indiera-----	Paralithic bedrock	40-55	7-40	Moderately cemented	---	---	None	High	High
	Lithic bedrock	60-82	---	Very strongly cemented					
AtD: Altamira-----	Paralithic bedrock	40-60	20-40	Noncemented	0	---	None	Moderate	Low
AtF: Altamira-----	Paralithic bedrock	40-60	20-40	Noncemented	0	---	None	Moderate	Low
BaB: Bahía-----	---	---	---	---	0	---	None	Low	Low
BhB: Bahía Salinas-----	---	---	---	---	0	---	None	Moderate	Low
BjA: Bajura-----	---	---	---	---	0	---	None	High	Moderate

Table 23.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		<i>In</i>	<i>In</i>		<i>In</i>	<i>In</i>			
BkB: Beaches-----	---	---	---	---	---	---	None	High	High
BmC: Bermeja-----	Paralithic bedrock	8-20	5-20	Moderately cemented	0	---	None	Moderate	Low
	Lithic bedrock	20-35	---	Indurated					
Cerro Mariquita-----	Paralithic bedrock	11-18	4-10	Very strongly cemented	0	---	None	Moderate	Low
	Lithic bedrock	15-25	---	Indurated					
BmD: Bermeja-----	Paralithic bedrock	8-20	5-20	Moderately cemented	0	---	None	Moderate	Low
	Lithic bedrock	20-35	---	Indurated					
Cerro Mariquita-----	Paralithic bedrock	11-18	4-10	Very strongly cemented	0	---	None	Moderate	Low
	Lithic bedrock	15-25	---	Indurated					
BmF: Bermeja-----	Paralithic bedrock	8-20	5-20	Moderately cemented	0	---	None	Moderate	Low
	Lithic bedrock	20-35	---	Indurated					
Cerro Mariquita-----	Paralithic bedrock	11-18	4-10	Very strongly cemented	0	---	None	Moderate	Low
	Lithic bedrock	15-25	---	Indurated					
BrF: Bermeja-----	Paralithic bedrock	8-20	5-20	Moderately cemented	0	---	None	Moderate	Low
	Lithic bedrock	20-35	---	Indurated					
Rock outcrop-----	Lithic bedrock	0	---	Indurated	0	---	None	---	---
CaC: Cabo Rojo-----	---	---	---	---	0	---	None	High	Moderate
CbD: Caguabo-----	Paralithic bedrock	10-20	0-7	Moderately cemented	0	---	None	Moderate	Low
	Lithic bedrock	16-20	---	Strongly cemented					

Table 23.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		<i>In</i>	<i>In</i>		<i>In</i>	<i>In</i>			
CbF: Caguabo-----	Paralithic bedrock	10-20	0-7	Moderately cemented	0	---	None	Moderate	Low
	Lithic bedrock	16-20	---	Strongly cemented					
CeA: Cartagena-----	---	---	---	---	0	---	None	High	Low
CgD: Casabe-----	Paralithic bedrock	9-17	3-40	Moderately cemented	0	---	None	Low	Low
	Lithic bedrock	14-41	---	Indurated					
CgF: Casabe-----	Paralithic bedrock	9-17	3-40	Moderately cemented	0	---	None	Low	Low
	Lithic bedrock	14-41	---	Indurated					
ChA: Cataño-----	---	---	---	---	0	---	None	Low	Low
CjD: Cerro Gordo-----	---	---	---	---	---	---	None	High	High
CkD: Cerro Mariquita-----	Paralithic bedrock	11-18	---	Very strongly cemented	0	---	None	Moderate	Low
	Lithic bedrock	15-25	---	Indurated					
CkF: Cerro Mariquita-----	Paralithic bedrock	11-18	---	Very strongly cemented	0	---	None	Moderate	Low
	Lithic bedrock	15-25	---	Indurated					
CmB: Coamo-----	---	---	---	---	0	---	None	Low	Low
CoA: Coloso-----	---	---	---	---	0	---	None	High	Moderate
CsE: Consumo-----	---	---	---	---	0	---	None	High	High
CsF: Consumo-----	---	---	---	---	0	---	None	High	High

Table 23.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		<i>In</i>	<i>In</i>		<i>In</i>	<i>In</i>			
CtA: Cortada-----	---	---	---	---	0	---	None	Moderate	Low
CuD: Costa-----	Paralithic bedrock	10-20	5-25	Weakly cemented	0	---	None	Low	Low
	Lithic bedrock	20-45	---	Moderately cemented					
Pitahaya-----	Paralithic bedrock	5-20	5-26	Strongly cemented	0	---	None	Low	Low
	Lithic bedrock	20-30	---	Indurated					
CuF: Costa-----	Paralithic bedrock	10-20	5-25	Weakly cemented	0	---	None	Low	Low
	Lithic bedrock	20-45	---	Moderately cemented					
Pitahaya-----	Paralithic bedrock	5-20	5-26	Strongly cemented	0	---	None	Low	Low
	Lithic bedrock	20-30	---	Indurated					
CvF: Cuchillas-----	Paralithic bedrock	15-28	4-21	Moderately cemented	0	---	None	Moderate	High
	Lithic bedrock	28-36	---	Strongly cemented					
CvG: Cuchillas-----	Paralithic bedrock	15-28	4-21	Moderately cemented	0	---	None	Moderate	High
	Lithic bedrock	28-36	---	Strongly cemented					
DeD: Delicias-----	---	---	---	---	0	---	None	High	Moderate
DqA: Dique-----	---	---	---	---	0	---	None	Low	Moderate
DsC: Descalabrado-----	Paralithic bedrock	10-16	2-11	Moderately cemented	0	---	None	Moderate	Low
	Lithic bedrock	16-25	---	Indurated					

Table 23.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		<i>In</i>	<i>In</i>		<i>In</i>	<i>In</i>			
DsD: Descalabrado-----	Paralithic bedrock	10-16	2-11	Moderately cemented	0	---	None	Moderate	Low
	Lithic bedrock	16-25	---	Indurated					
DsF: Descalabrado-----	Paralithic bedrock	10-16	2-11	Moderately cemented	0	---	None	Moderate	Low
	Lithic bedrock	16-25	---	Indurated					
EcD: El Cacique-----	Paralithic bedrock	6-13	3-15	Moderately cemented	0	---	None	Low	Low
	Lithic bedrock	12-20	---	Very strongly cemented					
La Taína-----	Paralithic bedrock	10-20	6-12	Moderately cemented	0	---	None	Low	Low
	Lithic bedrock	18-29	---	Very strongly cemented					
EcF: El Cacique-----	Paralithic bedrock	6-13	3-15	Moderately cemented	0	---	None	Low	Low
	Lithic bedrock	12-20	---	Very strongly cemented					
La Taína-----	Paralithic bedrock	10-20	6-12	Moderately cemented	0	---	None	Low	Low
	Lithic bedrock	18-29	---	Very strongly cemented					
EcG: El Cacique-----	Paralithic bedrock	6-13	3-15	Moderately cemented	0	---	None	Low	Low
	Lithic bedrock	12-20	---	Very strongly cemented					
La Taína-----	Paralithic bedrock	10-20	6-12	Moderately cemented	0	---	None	Low	Low
	Lithic bedrock	18-29	---	Very strongly cemented					
EdD: El Descanso-----	Lithic bedrock	15-19	---	Very strongly cemented	---	---	None	Low	Low

Table 23.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		<i>In</i>	<i>In</i>		<i>In</i>	<i>In</i>			
EdD: Hoconuco-----	Paralithic bedrock	11-25	5-13	Moderately cemented	---	---	None	Low	Low
	Lithic bedrock	20-37	---	Very strongly cemented					
EdF: El Descanso-----	Lithic bedrock	15-19	---	Very strongly cemented	---	---	None	Low	Low
Hoconuco-----	Paralithic bedrock	11-25	5-13	Moderately cemented	---	---	None	Low	Low
	Lithic bedrock	20-37	---	Very strongly cemented					
EdG: El Descanso-----	Lithic bedrock	15-19	---	Very strongly cemented	---	---	None	Low	Low
Hoconuco-----	Paralithic bedrock	11-25	5-13	Moderately cemented	---	---	None	Low	Low
	Lithic bedrock	20-37	---	Very strongly cemented					
EpC: El Papayo-----	Paralithic bedrock	7-17	2-11	Moderately cemented	0	---	None	Moderate	Low
	Lithic bedrock	12-25	---	Very strongly cemented					
EpD: El Papayo-----	Paralithic bedrock	7-17	2-11	Moderately cemented	0	---	None	Moderate	Low
	Lithic bedrock	12-25	---	Very strongly cemented					
EpF: El Papayo-----	Paralithic bedrock	7-17	2-11	Moderately cemented	0	---	None	Moderate	Low
	Lithic bedrock	12-25	---	Very strongly cemented					
FeA: Fé-----	---	---	---	---	0	---	None	High	Low
FrA: Fraternidad-----	---	---	---	---	0	---	None	High	Low

Table 23.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		<i>In</i>	<i>In</i>		<i>In</i>	<i>In</i>			
FrB: Fraternidad-----	---	---	---	---	0	---	None	High	Low
GbF: Guanábano-----	---	---	---	---	0	---	None	High	Low
GhC: Guanajibo-----	Plinthite	20-54	10-47	Weakly cemented	0	---	None	High	High
GnA: Guánica-----	Salic	50-65	11-43	---	0	---	None	High	Low
GuB: Guayabo-----	---	---	---	---	0	---	None	Low	Low
GyB: Guayacán-----	---	---	---	---	0	---	None	Moderate	Low
GyC: Guayacán-----	---	---	---	---	0	---	None	Moderate	Low
GyD: Guayacán-----	---	---	---	---	0	---	None	Moderate	Low
HmD: Humatas-----	---	---	---	---	0	---	None	High	High
HmE: Humatas-----	---	---	---	---	0	---	None	High	High
HmF: Humatas-----	---	---	---	---	0	---	None	High	High
JaB: Jácana-----	Paralithic bedrock	24-39	---	Weakly cemented	0	---	None	High	Low
JaC: Jácana-----	Paralithic bedrock	24-39	---	Weakly cemented	0	---	None	High	Low
JBA: Joyuda-----	---	---	---	---	20-40	36-48	None	---	---
Atolladero-----	---	---	---	---	---	---	None	---	---
Bajura-----	---	---	---	---	0	---	None	High	Moderate

Table 23.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		<i>In</i>	<i>In</i>		<i>In</i>	<i>In</i>			
LcE: La Covana-----	Petrocalcic	6-20	10-15	Indurated	0	---	None	Low	Low
Limestone outcrop-----	---	---	---	---	---	---	None	---	---
Seboruco-----	---	---	---	---	0	---	None	Low	Low
LdA: La Luna-----	---	---	---	---	0	---	None	Moderate	Low
LeF: La Tea-----	Paralithic bedrock	11-18	2-8	Moderately cemented	0	---	None	Low	Low
	Lithic bedrock	14-20	---	Indurated					
LfC: Landfill-----	---	---	---	---	---	---	None	---	---
LkB: Lares-----	---	---	---	---	0	---	None	High	High
LnA: Llanos Costa-----	---	---	---	---	0	---	None	Low	Moderate
LnB: Llanos Costa-----	---	---	---	---	0	---	None	Low	Moderate
LnC: Llanos Costa-----	---	---	---	---	0	---	None	Low	Moderate
LpG: Los Peñones-----	Lithic bedrock	3-15	---	Indurated	---	---	None	Low	Low
Limestone outcrop-----	---	---	---	---	---	---	None	---	---
MaB: Mabí-----	---	---	---	---	0	---	None	High	Moderate
MbA: Maguayo-----	---	---	---	---	0	---	None	High	Low
MbC: Maguayo-----	---	---	---	---	0	---	None	High	Low
McF: Malaya-----	Paralithic bedrock	7-20	---	Strongly cemented	0	---	None	High	Low

Table 23.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		<i>In</i>	<i>In</i>		<i>In</i>	<i>In</i>			
MDA: Manglillo-----	---	---	---	---	---	---	None	High	High
Boquerón-----	---	---	---	---	---	---	None	High	Low
Serrano-----	---	---	---	---	0	---	None	High	Low
MeA: Maní-----	---	---	---	---	0	---	None	High	Moderate
MfF: Maresúa-----	Paralithic bedrock	16-46	10-25	Moderately cemented	---	---	None	Low	Low
	Lithic bedrock	40-60	---	Very strongly cemented					
MgF: Maresúa-----	Paralithic bedrock	16-46	10-25	Moderately cemented	---	---	None	Low	Low
	Lithic bedrock	40-60	---	Very strongly cemented					
Serpentinite outcrop---	---	---	---	---	---	---	None	---	---
MiD: Mariana-----	---	---	---	---	0	---	None	High	High
MiE: Mariana-----	---	---	---	---	0	---	None	High	High
MkF: Maricao-----	---	---	---	---	0	---	None	High	High
MkG: Maricao-----	---	---	---	---	0	---	None	High	High
MnA: Melones-----	---	---	---	---	0	---	None	High	Low
MnC: Melones-----	---	---	---	---	0	---	None	High	Low
MoB: Montalva-----	Paralithic bedrock	20-40	---	Moderately cemented	0	---	None	High	Low

Table 23.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		<i>In</i>	<i>In</i>		<i>In</i>	<i>In</i>			
MoC: Montalva-----	Paralithic bedrock	20-40	---	Moderately cemented	0	---	None	High	Low
MqC: Montegrando-----	---	---	---	---	0	---	None	High	Moderate
MrD: Morado-----	Paralithic bedrock	20-40	8-16	Moderately cemented	0	---	None	Moderate	Low
	Lithic bedrock	31-80	---	Strongly cemented					
MrE: Morado-----	Paralithic bedrock	20-40	8-16	Moderately cemented	0	---	None	Moderate	Low
	Lithic bedrock	31-80	---	Strongly cemented					
MrF: Morado-----	Paralithic bedrock	20-40	8-16	Moderately cemented	0	---	None	Moderate	Low
	Lithic bedrock	31-80	---	Strongly cemented					
MuC: Múcara-----	Paralithic bedrock	20-40	---	Moderately cemented	0	---	None	High	Low
MuD: Múcara-----	Paralithic bedrock	20-40	---	Moderately cemented	0	---	None	High	Low
MuE: Múcara-----	Paralithic bedrock	20-40	---	Moderately cemented	0	---	None	High	Low
MuF: Múcara-----	Paralithic bedrock	20-40	---	Moderately cemented	0	---	None	High	Low
NpD: Nipe-----	---	---	---	---	---	---	None	High	High
OrA: Olivares-----	---	---	---	---	---	---	None	---	---
PaA: Palmarejo-----	---	---	---	---	0	---	None	High	High

Table 23.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		<i>In</i>	<i>In</i>		<i>In</i>	<i>In</i>			
PaB: Palmarejo-----	---	---	---	---	0	---	None	High	High
PaC: Palmarejo-----	---	---	---	---	0	---	None	High	High
PgA: Parguera-----	---	---	---	---	0	---	None	High	Low
PgB: Parguera-----	---	---	---	---	0	---	None	High	Low
PsF: Pitahaya-----	Paralithic bedrock	5-20	5-26	Strongly cemented	0	---	None	Low	Low
	Lithic bedrock	20-30	---	Indurated					
Limestone outcrop-----	---	---	---	---	---	---	None	---	---
Seboruco-----	---	---	---	---	0	---	None	Low	Low
PsG: Pitahaya-----	Paralithic bedrock	5-20	5-26	Strongly cemented	0	---	None	Low	Low
	Lithic bedrock	20-30	---	Indurated					
Limestone outcrop-----	---	---	---	---	---	---	None	---	---
Seboruco-----	---	---	---	---	0	---	None	Low	Low
Pt: Pits and quarries-----	---	---	---	---	---	---	---	---	---
PzB: Pozo Blanco-----	---	---	---	---	0	---	None	Moderate	Low
PzC: Pozo Blanco-----	---	---	---	---	0	---	None	Moderate	Low
PzD: Pozo Blanco-----	---	---	---	---	0	---	None	Moderate	Low
QbD: Quebrada-----	Paralithic bedrock	9-20	---	Very weakly cemented	0	---	None	High	Low

Table 23.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		<i>In</i>	<i>In</i>		<i>In</i>	<i>In</i>			
QbE: Quebrada-----	Paralithic bedrock	9-20	---	Very weakly cemented	0	---	None	High	Low
QbF: Quebrada-----	Paralithic bedrock	9-20	---	Very weakly cemented	0	---	None	High	Low
ReA: Reilly-----	---	---	---	---	0	---	None	Low	Moderate
RoD: Rosario-----	Paralithic bedrock	20-45	12-25	Moderately cemented	---	---	None	High	High
	Lithic bedrock	35-45	---	Strongly cemented					
RoE: Rosario-----	Paralithic bedrock	20-45	12-25	Moderately cemented	---	---	None	High	High
	Lithic bedrock	35-45	---	Strongly cemented					
RoF: Rosario-----	Paralithic bedrock	20-45	12-25	Moderately cemented	---	---	None	High	High
	Lithic bedrock	35-45	---	Strongly cemented					
RuF: Rubias-----	Paralithic bedrock	10-25	9-25	Moderately cemented	---	---	None	Moderate	Low
	Lithic bedrock	18-50	---	Indurated					
Chiquito-----	Lithic bedrock	14-19	---	Strongly cemented	---	---	None	Moderate	Low
RuG: Rubias-----	Paralithic bedrock	10-25	9-25	Moderately cemented	---	---	None	Moderate	Low
	Lithic bedrock	18-50	---	Indurated					
Chiquito-----	Lithic bedrock	14-19	---	Strongly cemented	---	---	None	Moderate	Low
Sa: Salt flats, ponded-----	---	---	---	---	---	---	---	High	High
Sb: Salt pits-----	---	---	---	---	---	---	---	High	High

Table 23.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		<i>In</i>	<i>In</i>		<i>In</i>	<i>In</i>			
ScA: San Antón-----	---	---	---	---	0	---	None	Moderate	Low
SdD: San Germán-----	Lithic bedrock	10-60	---	Very strongly cemented	0	---	None	Low	Low
SdF: San Germán-----	Lithic bedrock	10-60	---	Very strongly cemented	0	---	None	Low	Low
SgD: San Germán-----	Lithic bedrock	10-60	---	Very strongly cemented	0	---	None	Low	Low
Duey-----	Paralithic bedrock	7-20	5-37	Moderately cemented	0	---	None	Low	Low
	Lithic bedrock	12-55	---	Very strongly cemented					
SgF: San Germán-----	Lithic bedrock	10-60	---	Very strongly cemented	0	---	None	Low	Low
	Paralithic bedrock	7-20	5-37	Moderately cemented					
	Lithic bedrock	12-55	---	Very strongly cemented					
SiA: Santa Isabel-----	---	---	---	---	0	---	None	High	Low
SmE: Santa Marta-----	Paralithic bedrock	20-40	---	Moderately cemented	0	---	None	High	Moderate
	Lithic bedrock	33-64	---	Indurated					
SoC: Seboruco-----	---	---	---	---	0	---	None	Low	Low
SsB: Sosa-----	---	---	---	---	0	---	None	Low	Moderate
SsC: Sosa-----	---	---	---	---	0	---	None	Low	Moderate

Table 23.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		<i>In</i>	<i>In</i>		<i>In</i>	<i>In</i>			
TeA: Teresa-----	---	---	---	---	0	---	None	High	Low
TfA: Teresa, ponded-----	---	---	---	---	0	---	None	High	Low
ToA: Toa-----	---	---	---	---	0	---	None	Moderate	Low
Ua: Urban land.									
Ubb: Urban land.									
Bahía-----	---	---	---	---	0	---	None	Low	Low
UgB: Urban land.									
Guayabo-----	---	---	---	---	0	---	None	Low	Low
Usc: Urban land.									
Sosa-----	---	---	---	---	0	---	None	Low	Moderate
VaA: Vayas-----	---	---	---	---	0	---	None	High	Low
VoC: Voladora-----	Plinthite	15-48	---	---	0	---	None	High	High
VoD: Voladora-----	Plinthite	15-48	---	---	0	---	None	High	High
W: Water.									

Table 24.--Water Features

[Depths of layers are in feet. See text for definitions of terms used in this table. Estimates of the frequency of ponding and flooding apply to the whole year rather than to individual months. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
AbF: Agüeybaná-----	D	High	Jan-Dec	Ft	Ft	Ft				
				---	---	---	---	---	---	None
AgD: Aguilita-----	C	Medium	Jan-Dec	---	---	---	---	---	---	None
AgF: Aguilita-----	C	High	Jan-Dec	---	---	---	---	---	---	None
AkA: Aguirre-----	D	Negligible	Jan-Jul	---	---	---	---	---	---	None
			Aug-Oct	---	---	0.0-2.0	Brief	Occasional	---	None
			Nov-Dec	---	---	---	---	---	---	None
AlF: Aljibe-----	C	High	Jan-Dec							
Guamá-----	C	High	Jan-Dec	---	---	---	---	None	---	None
Indiera-----	C	High	Jan-Dec	---	---	---	---	None	---	None
AtD: Altamira-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
AtF: Altamira-----	D	High	Jan-Dec	---	---	---	---	None	---	None
BaB: Bahía-----	A	Negligible	Jan-Dec	---	---	---	---	None	---	None

Table 24.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				<i>Ft</i>	<i>Ft</i>	<i>Ft</i>				
BhB: Bahía Salinas-----	A	Negligible	Jan-Dec	---	---	---	---	None	---	Rare
BjA: Bajura-----	D	Negligible	Jan-Jun	0.5-2.5	2.5-6.0	---	---	None	Brief	Occasional
			Jul-Oct	0.5-2.5	2.5-6.0	---	---	None	Long	Frequent
			Nov-Dec	0.5-2.5	2.5-6.0	---	---	None	Brief	Occasional
BkB: Beaches-----	A	Negligible	Jan-Dec	---	---	---	---	None	---	---
BmC: Bermeja-----	C	Medium	Jan-Dec	---	---	---	---	None	---	None
Cerro Mariquita-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
BmD: Bermeja-----	C	Medium	Jan-Dec	---	---	---	---	None	---	None
Cerro Mariquita-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
BmF: Bermeja-----	C	High	Jan-Dec	---	---	---	---	None	---	None
Cerro Mariquita-----	D	High	Jan-Dec	---	---	---	---	None	---	None
BrF: Bermeja-----	C	High	Jan-Dec	---	---	---	---	None	---	None
Rock outcrop-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
CaC: Cabo Rojo-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None

Table 24.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				<i>Ft</i>	<i>Ft</i>	<i>Ft</i>				
CbD: Caguabo-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
CbF: Caguabo-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
CeA: Cartagena-----	D	Low	Jan-Jul	---	---	---	---	None	---	None
			Aug-Oct	---	---	0.0-0.5	Very brief	Rare	---	None
			Nov-Dec	---	---	---	---	None	---	None
CgD: Casabe-----	D	High	Jan-Dec	---	---	---	---	None	---	None
CgF: Casabe-----	D	High	Jan-Dec	---	---	---	---	None	---	None
ChA: Cataño-----	A	Negligible	Jan-Dec	---	---	---	---	None	---	None
CjD: Cerro Gordo-----	B	Low	Jan-Dec	---	---	---	---	None	---	None
CkD: Cerro Mariquita-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
CkF: Cerro Mariquita-----	D	High	Jan-Dec	---	---	---	---	None	---	None
CmB: Coamo-----	C	Low	Jan-Dec	---	---	---	---	None	---	None

Table 24.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
CoA: Coloso-----	D	Negligible	Jul-Sep	2.0-4.0	4.0-6.0	---	---	None	Brief	Occasional
CsE: Consumo-----	D	High	Jan-Dec	---	---	---	---	None	---	None
CsF: Consumo-----	D	High	Jan-Dec	---	---	---	---	None	---	None
CtA: Cortada-----	C	Negligible	Jan-Jul Aug-Oct Nov-Dec	---	---	---	---	None Occasional None	---	None Occasional None
CuD: Costa-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
Pitahaya-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
CuF: Costa-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
Pitahaya-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
CvF: Cuchillas-----	C	High	Jan-Dec	---	---	---	---	None	---	None
CvG: Cuchillas-----	C	Very high	Jan-Dec	---	---	---	---	None	---	None
DeD: Delicias-----	C	Medium	Jan-Dec	---	---	---	---	None	---	None

Table 24.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
DqA: Dique-----	C	Negligible	Jun-Oct	Ft ---	Ft ---	Ft ---	---	None	Very brief	Frequent
DsC: Descalabrado-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
DsD: Descalabrado-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
DsF: Descalabrado-----	D	High	Jan-Dec	---	---	---	---	None	---	None
EcD: El Cacique-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
La Taína-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
EcF: El Cacique-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
La Taína-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
EcG: El Cacique-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
La Taína-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
Edd: El Descanso-----	C	Very high	Jan-Dec	---	---	---	---	None	---	None
Hoconuco-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None

Table 24.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
EdF:				<i>Ft</i>	<i>Ft</i>	<i>Ft</i>				
El Descanso-----	C	Very high	Jan-Dec	---	---	---	---	None	---	None
Hoconuco-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
EdG:										
El Descanso-----	C	Very high	Jan-Dec	---	---	---	---	None	---	None
Hoconuco-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
EpC:										
El Papayo-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
EpD:										
El Papayo-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
EpF:										
El Papayo-----	D	High	Jan-Dec	---	---	---	---	None	---	None
FeA:										
Fé-----	D	Medium	Jan-Aug	---	---	---	---	None	---	None
			Sep-Nov	4.0-6.0	>6.0	---	---	None	---	None
			December	---	---	---	---	None	---	None
FrA:										
Fraternidad-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
FrB:										
Fraternidad-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
GbF:										
Guanábano-----	D	High	Jan-Dec	---	---	---	---	None	---	None

Table 24.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
GhC: Guanajibo-----	D	Medium	Jan-Dec	Ft ---	Ft ---	Ft ---	---	None	---	None
GnA: Guánica-----	D	Negligible	Jan-Jul Aug-Oct Nov-Dec	--- --- ---	--- --- ---	--- 0.0-1.5 ---	--- Long ---	--- Frequent ---	--- --- ---	None None None
GuB: Guayabo-----	A	Negligible	Jan-Dec	---	---	---	---	None	---	None
GyB: Guayacán-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
GyC: Guayacán-----	D	High	Jan-Dec	---	---	---	---	None	---	None
GyD: Guayacán-----	D	High	Jan-Dec	---	---	---	---	None	---	None
HmD: Humatas-----	D	High	Jan-Dec	---	---	---	---	None	---	None
HmE: Humatas-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
HmF: Humatas-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
JaB: Jácana-----	D	Low	Jan-Dec	---	---	---	---	None	---	None
JaC: Jácana-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None

Table 24.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				<i>Ft</i>	<i>Ft</i>	<i>Ft</i>				
JBA: Joyuda-----	D	Negligible	Jan-Jun	0.1-1.5	1.5-1.6	---	---	None	Brief	Occasional
			Jul-Oct	0.1-1.5	1.5-1.6	---	---	None	Long	Frequent
			Nov-Dec	0.1-1.5	1.5-1.6	---	---	None	Brief	Occasional
Atolladero-----	D	Negligible	Jan-Jun	---	---	---	---	None	Brief	Occasional
			Jul-Sep	0.5-2.5	>6.0	---	---	None	Brief	Frequent
			October	---	---	---	---	None	Brief	Frequent
			Nov-Dec	---	---	---	---	None	Brief	Occasional
Bajura-----	D	Negligible	Jan-Jun	0.5-2.5	2.5-6.0	---	---	None	Brief	Occasional
			Jul-Oct	0.5-2.5	2.5-6.0	---	---	None	Long	Frequent
			Nov-Dec	0.5-2.5	2.5-6.0	---	---	None	Brief	Occasional
LcE: La Covana-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
Limestone outcrop-----	---	Very high	Jan-Dec	---	---	---	---	None	---	---
Seboruco-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
LdA: La Luna-----	D	Negligible	Aug-Oct	---	---	---	---	None	Brief	Occasional
LeF: La Tea-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
LfC: Landfill-----	---	Low	Jan-Dec	---	---	---	---	None	---	---
LkB: Lares-----	D	Low	Jan-Dec	---	---	---	---	None	---	None
LnA: Llanos Costa-----	D	Very low	Jan-Dec	---	---	---	---	None	---	None

Table 24.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				<i>Ft</i>	<i>Ft</i>	<i>Ft</i>				
LnB: Llanos Costa-----	D	Low	Jan-Dec	---	---	---	---	None	---	None
LnC: Llanos Costa-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
LpG: Los Peñones-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
Limestone outcrop-----	---	---	Jan-Dec	---	---	---	---	None	---	---
MaB: Mabí-----	D	Medium	Jan-May	---	---	---	---	None	---	None
			Jun-Oct	1.5	3.0-6.7	---	---	None	---	Rare
			Nov-Dec	---	---	---	---	None	---	None
MbA: Maguayo-----	D	Low	Jan-Dec	---	---	---	---	None	---	None
MbC: Maguayo-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
McF: Malaya-----	D	High	Jan-Dec	---	---	---	---	None	---	None
MDA: Manglillo-----	D	Negligible	Jan-Jun	0.0-1.0	1.0-6.0	---	---	---	Brief	Occasional
			Jul-Oct	0.0-1.0	1.0-6.0	---	---	---	Long	Frequent
			Nov-Dec	0.0-1.0	1.0-6.0	---	---	---	Brief	Occasional
Boquerón-----	D	---	Jan-Jun	0.0-1.0	1.0-6.0	---	---	---	Brief	Occasional
			Jul-Oct	0.0-1.0	1.0-6.0	---	---	---	Brief	Frequent
			Nov-Dec	0.0-1.0	1.0-6.0	---	---	---	Brief	Occasional

Table 24.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
MDA: Serrano-----	D	Negligible		<i>Ft</i>	<i>Ft</i>	<i>Ft</i>				
			Jan-Jun	0.0-1.0	1.0-6.0	---	---	---	Brief	Occasional
			Jul-Oct	0.0-1.0	1.0-6.0	---	---	---	Brief	Frequent
			Nov-Dec	0.0-1.0	1.0-6.0	---	---	---	Brief	Occasional
MeA: Maní-----	D	Negligible	Jul-Oct	2.0-4.0	4.0-6.7	---	---	None	Brief	Occasional
MfF: Maresúa-----	C	High	Jan-Dec	---	---	---	---	None	---	None
MgF: Maresúa-----	C	High	Jan-Dec	---	---	---	---	None	---	None
Serpentinite outcrop-----	D	---	Jan-Dec	---	---	---	---	None	---	---
MiD: Mariana-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
MiE: Mariana-----	D	High	Jan-Dec	---	---	---	---	None	---	None
MkF: Maricao-----	D	High	Jan-Dec	---	---	---	---	None	---	None
MkG: Maricao-----	D	High	Jan-Dec	---	---	---	---	None	---	None
MnA: Melones-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
MnC: Melones-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None

Table 24.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				<i>Ft</i>	<i>Ft</i>	<i>Ft</i>				
MoB: Montalva-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
MoC: Montalva-----	D	High	Jan-Dec	---	---	---	---	None	---	None
MqC: Montegrande-----	D	Medium	Jan-Jun	---	---	---	---	None	---	None
			Jul-Sep	2.5-5.0	5.0-6.7	---	---	None	---	None
			Oct-Dec	---	---	---	---	None	---	None
MrD: Morado-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
MrE: Morado-----	D	High	Jan-Dec	---	---	---	---	None	---	None
MrF: Morado-----	D	High	Jan-Dec	---	---	---	---	None	---	None
MuC: Múcara-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
MuD: Múcara-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
MuE: Múcara-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
MuF: Múcara-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
NpD: Nipe-----	C	Medium	Jan-Dec	---	---	---	---	None	---	None

Table 24.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
OrA: Olivares-----	D	Negligible	Jan-Dec	<i>Ft</i>	<i>Ft</i>	<i>Ft</i>				
				---	---	0.0-1.0	Long	Frequent	---	---
PaA: Palmarejo-----	D	Low	Jan-Dec	---	---	---	---	None	---	None
PaB: Palmarejo-----	D	Low	Jan-Dec	---	---	---	---	None	---	None
PaC: Palmarejo-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
PgA: Parguera-----	D	Low	Jan-Dec	---	---	---	---	None	---	None
PgB: Parguera-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
PsF: Pitahaya-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
Limestone outcrop-----	---	Very high	Jan-Dec	---	---	---	---	None	---	---
Seboruco-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
PsG: Pitahaya-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
Limestone outcrop-----	---	Very high	Jan-Dec	---	---	---	---	None	---	---
Seboruco-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None

Table 24.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
Pt: Pits and quarries-----	---	---	Jan-Dec	<i>Ft</i>	<i>Ft</i>	<i>Ft</i>				
				---	---	---	---	None	---	---
PzB: Pozo Blanco-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
PzC: Pozo Blanco-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
PzD: Pozo Blanco-----	D	High	Jan-Dec	---	---	---	---	None	---	None
QbD: Quebrada-----	C	Medium	Jan-Dec	---	---	---	---	None	---	None
QbE: Quebrada-----	C	High	Jan-Dec	---	---	---	---	None	---	None
QbF: Quebrada-----	C	High	Jan-Dec	---	---	---	---	None	---	None
ReA: Reilly-----	A	Negligible	Aug-Oct	2.5	>6.0	---	---	None	Very brief	Frequent
RoD: Rosario-----	C	High	Jan-Dec	---	---	---	---	None	---	None
RoE: Rosario-----	C	Very high	Jan-Dec	---	---	---	---	None	---	None
RoF: Rosario-----	C	Very high	Jan-Dec	---	---	---	---	None	---	None

Table 24.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
RuF: Rubias-----	C	High	Jan-Dec	---	---	---	---	None	---	None
Chiquito-----	D	High	Jan-Dec	---	---	---	---	None	---	None
RuG: Rubias-----	C	High	Jan-Dec	---	---	---	---	None	---	None
Chiquito-----	D	High	Jan-Dec	---	---	---	---	None	---	None
Sa: Salt flats, ponded-----	A	Negligible	Jan-Dec	---	---	0.3-1.0	Long	Frequent	Very brief	Frequent
Sb: Salt pits-----	A	---	Jan-Dec	---	---	0.0-1.0	Very brief	Frequent	Very brief	Frequent
SCA: San Antón-----	C	Negligible	Jan-Jul Aug-Oct Nov-Dec	---	---	---	---	None None None	--- Brief ---	None Occasional None
SdD: San Germán-----	D	High	Jan-Dec	---	---	---	---	None	---	None
SdF: San Germán-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
SgD: San Germán-----	D	High	Jan-Dec	---	---	---	---	None	---	None
Duey-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None

Table 24.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
SgF:				<i>Ft</i>	<i>Ft</i>	<i>Ft</i>				
San Germán-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
Duey-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
SiA:										
Santa Isabel-----	D	Medium	Jan-Aug	---	---	---	---	None	---	None
			Sep-Nov	5.0-6.0	>6.0	---	---	None	---	None
			December	---	---	---	---	None	---	None
SmE:										
Santa Marta-----	C	High	Jan-Dec	---	---	---	---	None	---	None
SoC:										
Seboruco-----	D	High	Jan-Dec	---	---	---	---	None	---	None
SsB:										
Sosa-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
SsC:										
Sosa-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
TeA:										
Teresa-----	D	Negligible	Jan-Dec	---	---	---	---	None	---	None
TfA:										
Teresa, ponded-----	D	Negligible	Jan-Jul	---	---	---	---	None	---	None
			Aug-Oct	---	---	0.0-1.0	Long	Occasional	---	None
			Nov-Dec	---	---	---	---	None	---	None
ToA:										
Toa-----	C	Negligible	Jul-Oct	---	---	---	---	None	Brief	Occasional
Ua:										
Urban land-----	---	---	Jan-Dec	---	---	---	---	None	---	---

Table 24.--Water Features--Continued

Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Water table		Ponding			Flooding	
				Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
UbB: Urban land-----	---	---	Jan-Dec	Ft	Ft	Ft	---	None	---	---
Bahía-----	A	Negligible	Jan-Dec	---	---	---	---	None	---	None
UgB: Urban land-----	---	---	Jan-Dec	---	---	---	---	None	---	---
Guayabo-----	A	Negligible	Jan-Dec	---	---	---	---	None	---	None
UsC: Urban land-----	---	---	Jan-Dec	---	---	---	---	None	---	---
Sosa-----	D	Medium	Jan-Dec	---	---	---	---	None	---	None
VaA: Vayas-----	D	Negligible	Jan-Jul	0.3-1.6	1.6-6.0	---	---	None	---	None
			Aug-Oct	0.3-1.6	1.6-6.0	---	---	None	Brief	Occasional
			Nov-Dec	0.3-1.6	1.6-6.0	---	---	None	---	None
VoC: Voladora-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
VoD: Voladora-----	D	Very high	Jan-Dec	---	---	---	---	None	---	None
W: Water.										

Soil Survey of San Germán Area, Puerto Rico

Table 25.--Pedons Sampled for Laboratory Analysis

Sample number	Sampled name	Recorelated Name	Pedon ID
S57PR079002	Palmarejo	Palmarejo	40A249
S57PR079003	Cartagena	Cartagena	57PR07900
S63PR067001	Toa	Toa	40A546
S95PR055002	Guánica	Guánica	95P0600
S97PR023001	Teresa	Teresa	97P478
S97PR023002	Aguilita	Altamira	97P0479
S97PR023003	Fraternidad, gravelly clay substratum	Melones	97P0480
S97PR079001	Pozo Blanco	Guayacán	97P0481
S97PR079002	Duey	Costa	97P0482
S97PR079003	San Germán	Pitahaya	97P483
S97PR079004	Parguera	Parguera	97P0484
S99PR055003	San Antón	San Antón	86P0223
S99PR079006	Maguayo	Maguayo	81P0319
S99PR079007	Mariana	Mariana	86P0226
S99PR023001	Americus	Bahía	81P0315
S99PR023004	Sosa	Sosa	81P0317
S99PR023016	Amelia	Llanos Costa	86P0222
S99PR023017	Guayabo	Guayabo	81P0316
S99PR079001	Fraternidad	Fraternidad	94P0845
S99PR079005	Fé	Fé	40A0525
S99PR079010	Santa Isabel	Santa Isabel	81P0318
S99PR125001	Maresúa	La Taína	88P376
S00PR125001	Maresúa	Maresúa	01N1039
S00PR125004	Santa Marta	Santa Marta	0P5728S
S01PR079001	Descalabrado	Descalabrado	40A556
S01PR153001	Los Guineos	Agüeybaná	01P1038
S01PR153002	Malaya	Malaya	1P1037
S01PR153004	Maricao	Maricao	1P1036
S01PR153005	Descalabrado	Guanábano	01N1041
S02PR023002	Guanajibo	Guanajibo	03N0657
S02PR067001	Limestone rock land	La Tea	03N0658
S02PR125005	Nipe	Nipe	03N0659
S02PR125006	Rosario	Rosario	03N0660
S04PR023005	Cabo Rojo	Cabo Rojo	05N0805
S04PR023009	Coloso	Coloso	04N0613
S04PR023010	Lares	Lares	04N0610
S04PR023021	Delicias	Delicias	05N0906
S06PR055007	La Covana	La Covana	07N0374
S06PR023006	Morado	Morado	07N0369
S06PR023024	Múcara	Múcara	07N0370
S07PR125007	Cerro Gordo	Cerro Gordo	07N0765

Soil Survey of San Germán Area, Puerto Rico

Table 26.--Taxonomic Classification of the Soils

Soil name	Family or higher taxonomic class
Agüeybaná-----	Very-fine, mixed, subactive, isothermic Typic Haplohumults
Aguilita-----	Coarse-loamy, carbonatic, isohyperthermic Aridic Calciustolls
Aguirre-----	Very-fine, smectitic, isohyperthermic Sodic Haplusterts
Aljibe-----	Clayey, ferruginous, isothermic, shallow Rhodic Haploperox
Altamira-----	Coarse-loamy, carbonatic, isohyperthermic Typic Haplocalcids
Atolladero-----	Carbonatic, isohyperthermic Typic Psammaquents
Bahía-----	Sandy, kaolinitic, isohyperthermic Typic Paleargids
Bahía Salinas-----	Carbonatic, isohyperthermic Typic Torripsamments
Bajura-----	Fine, mixed, superactive, isohyperthermic Vertic Endoaquolls
Bermeja-----	Loamy, mixed, active, isohyperthermic, shallow Typic Haplocambids
Boquerón-----	Fine, mixed, superactive, nonacid, isohyperthermic Vertic Fluvaquents
Cabo Rojo-----	Fine, mixed, semiactive, isohyperthermic Vertic Paleudults
Caguabo-----	Loamy, mixed, active, isohyperthermic, shallow Typic Eutrudepts
Cartagena-----	Fine, mixed, superactive, isohyperthermic Sodic Haplusterts
Casabe-----	Clayey, magnesian, isohyperthermic, shallow Ustic Haplargids
Cataño-----	Carbonatic, isohyperthermic Typic Udipsamments
Cerro Gordo-----	Fine-loamy, mixed, isothermic Typic Haploperox
Cerro Mariquita-----	Clayey, mixed, active, isohyperthermic, shallow Typic Haplargids
Chiquito-----	Clayey-skeletal, mixed, active, isothermic Lithic Eutrudepts
Coamo-----	Fine, mixed, superactive, isohyperthermic Typic Argiustolls
Coloso-----	Fine, mixed, active, isohyperthermic Vertic Dystrudepts
Consumo-----	Fine, mixed, semiactive, isohyperthermic Typic Haplohumults
Cortada-----	Fine, smectitic, isohyperthermic Cumulic Haplustolls
Costa-----	Clayey, carbonatic, isohyperthermic, shallow Typic Torriorthents
Cuchillas-----	Loamy, mixed, active, isothermic, shallow Typic Dystrudepts
Delicias-----	Fine, ferruginous, isohyperthermic Rhodic Hapludox
Descalabrado-----	Clayey, mixed, superactive, isohyperthermic, shallow Typic Haplustolls
Dique-----	Fine-loamy, mixed, active, isohyperthermic Fluventic Eutrudepts
Duey-----	Clayey-skeletal, mixed, superactive, isohyperthermic, shallow Typic Haplustolls
El Cacique-----	Clayey, magnesian, isohyperthermic, shallow Typic Argiudolls
El Descanso-----	Clayey-skeletal, magnesian, isothermic Lithic Argiudolls
El Payayo-----	Clayey, mixed, superactive, isohyperthermic, shallow Typic Haplocambids
Fé-----	Fine, smectitic, isohyperthermic Sodic Haplusterts
Fraternidad-----	Fine, smectitic, isohyperthermic Typic Haplusterts
Guamá-----	Very-fine, ferruginous, isothermic Rhodic Haploperox
Guanábano-----	Fine, smectitic, isohyperthermic Calcic Argiustolls
Guanajibo-----	Very-fine, ferruginous, isohyperthermic Plinthic Kandihumults
Guánica-----	Very-fine, smectitic, isohyperthermic Typic Calciaquerts
Guayabo-----	Mixed, isohyperthermic Arenic Paleargids
Guayacán-----	Fine-loamy, mixed, superactive, isohyperthermic Typic Haplocalcids
Hoconuco-----	Clayey, magnesian, isothermic, shallow Typic Argiudolls
Humatas-----	Very-fine, parasesquic, isohyperthermic Typic Haplohumults
Indiera-----	Very-fine, ferruginous, isothermic Typic Haploperox
Jácana-----	Fine, mixed, superactive, isohyperthermic Vertic Haplustolls
Joyuda-----	Euic, isohyperthermic Hydric Haplohemists
La Covana-----	Clayey-skeletal, carbonatic, isohyperthermic Calcic Lithic Petrocalcids
La Luna-----	Fine-loamy, mixed, active, isohyperthermic Typic Calciargids
La Taína-----	Clayey-skeletal, magnesian, isohyperthermic, shallow Typic Argiudolls
La Tea-----	Clayey, vermiculitic, isohyperthermic, shallow Typic Argiudolls
Lares-----	Very-fine, mixed, semiactive, isohyperthermic Aquic Hapludults
Llanos Costa-----	Fine, mixed, semiactive, isohyperthermic Typic Haplargids
Los Peñones-----	Euic, isohyperthermic Lithic Udifolists
Mabi-----	Very-fine, mixed, active, isohyperthermic Aquic Hapluderts
Maguayo-----	Fine, mixed, superactive, isohyperthermic Vertic Calciargids
Malaya-----	Clayey, mixed, superactive, isohyperthermic, shallow Typic Eutrudepts
Manglillo-----	Euic, isohyperthermic Fluvaquentic Haplohemists
Maní-----	Fine, mixed, semiactive, isohyperthermic Fluvaquentic Eutrudepts
Maresúa-----	Clayey-skeletal, magnesian, isohyperthermic Typic Argiudolls
Mariana-----	Fine, mixed, active, isohyperthermic Typic Haplohumults
Maricao-----	Very-fine, mixed, subactive, isothermic Typic Haplohumults
Melones-----	Fine, smectitic, isohyperthermic Chromic Calcitorrerts
Montalva-----	Fine, mixed, superactive, isohyperthermic Typic Haplotorrerts
Montegrande-----	Very-fine, mixed, superactive, isohyperthermic Chromic Hapluderts

Soil Survey of San Germán Area, Puerto Rico

Table 26.--Taxonomic Classification of the Soils--Continued

Soil name	Family or higher taxonomic class
Morado-----	Fine, mixed, superactive, isohyperthermic Dystric Eutrudepts
Múcara-----	Coarse-loamy, vermiculitic, isohyperthermic Dystric Eutrudepts
Nipe-----	Very-fine, ferruginous, isohyperthermic Typic Acrudox
Olivares-----	Fine, mixed, superactive, nonacid, isohyperthermic Typic Endoaquents
Palmarejo-----	Fine, mixed, semiactive, isohyperthermic Typic Haplustults
Parguera-----	Clayey-skeletal, carbonatic, isohyperthermic Typic Calciargids
Pitahaya-----	Clayey-skeletal, mixed, superactive, nonacid, isohyperthermic, shallow Typic Torriorthents
Pozo Blanco-----	Fine-loamy, mixed, superactive, isohyperthermic Aridic Calciustolls
Quebrada-----	Clayey, mixed, active, isohyperthermic, shallow Typic Hapludalfs
Reilly-----	Sandy-skeletal, mixed, isohyperthermic Mollic Udifluvents
Rosario-----	Clayey, ferruginous, isohyperthermic, shallow Inceptic Hapludox
Rubias-----	Fine, mixed, active, isothermic Humic Eutrudepts
San Antón-----	Fine-loamy, mixed, superactive, isohyperthermic Cumulic Haplustolls
San Germán-----	Clayey-skeletal, mixed, superactive, isohyperthermic Lithic Haplustolls
Santa Isabel-----	Fine, smectitic, isohyperthermic Typic Haplusterts
Santa Marta-----	Fine, magnesian, isohyperthermic Typic Kanhapludalfs
Seboruco-----	Fine-loamy, mixed, superactive, isohyperthermic Typic Calciargids
Serrano-----	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, nonacid, isohyperthermic Typic Endoaquepts
Sosa-----	Fine, kaolinitic, isohyperthermic Aridic Haplustalfs
Teresa-----	Very-fine, smectitic, isohyperthermic Sodic Haplusterts
Toa-----	Fine, mixed, active, isohyperthermic Fluventic Hapludolls
Vayas-----	Fine, smectitic, isohyperthermic Vertic Endoaquolls
Voladora-----	Very-fine, mixed, active, isohyperthermic Plinthic Haplohumults

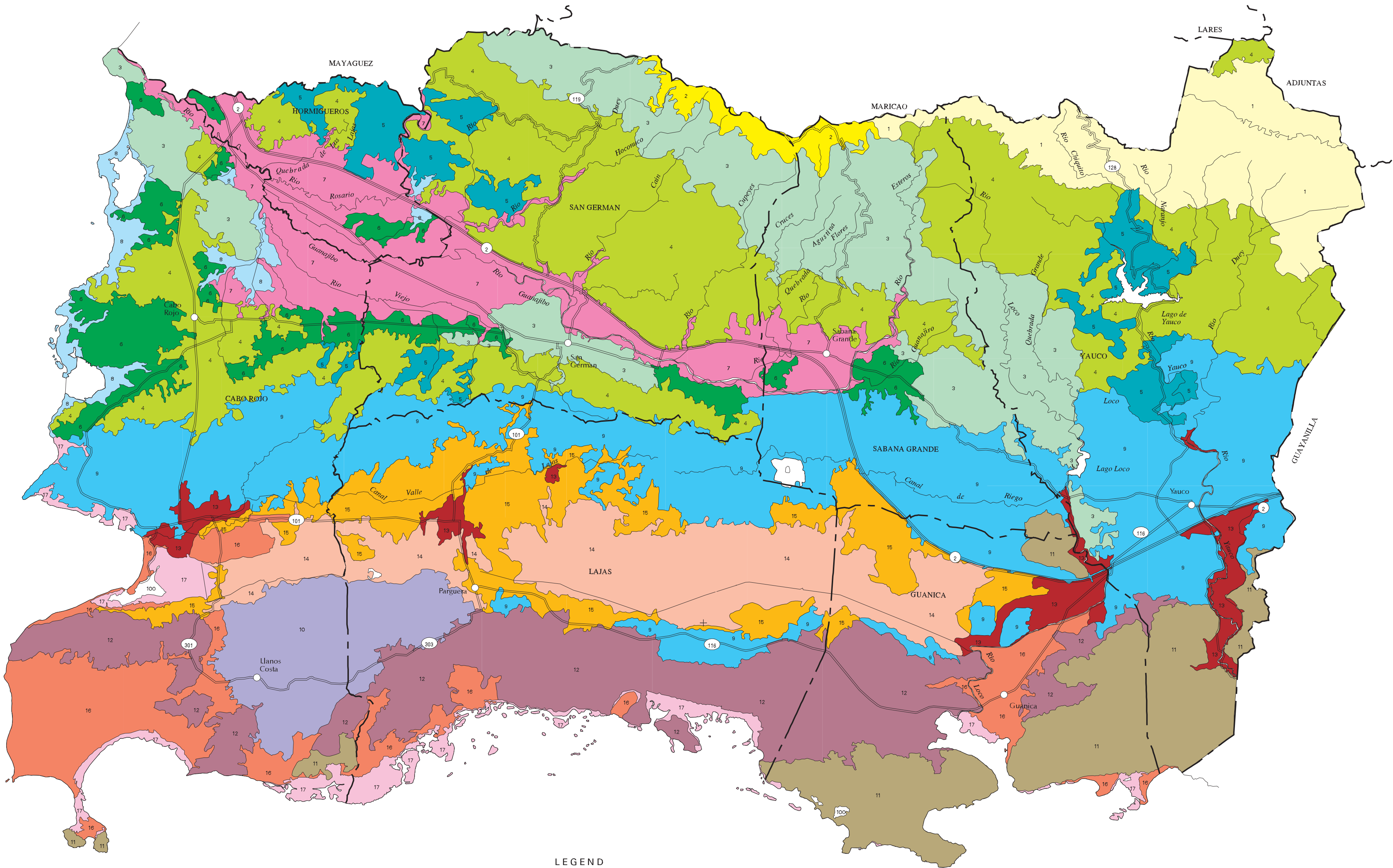
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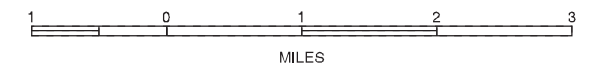
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LEGEND

- | | | | |
|---|---|----|--|
| 1 | Soils of the Perudic Uplands | 10 | Soils of the Arid Uplands |
| 2 | Agueybana-Maricao-Rubias Association | 11 | Llanos Costa-Cerro Mariquita-Bermeja Association |
| 3 | El Descanso-Hoconuco-Cerro Gordo Association | 12 | Pitahaya-Limestone outcrop-La Covana Association |
| 4 | Soils of the Humid Uplands | 13 | Costa-Pitahaya-El Papayo Association |
| 5 | El Cacique-La Taina-Nipe Association | 14 | Soils of the Semiarid Coastal Plains |
| 6 | Caguabo-Consumo-Humatas Association | 15 | San Anton-Vayas-Cortada Association |
| 7 | Malaya-La Tea-Limestone outcrop Association | 16 | Aguirre-Guanica-Cartagena Association |
| 8 | Montegrando-Voladora-Guanajibo Association | 17 | Fraternidad-Palmarejo-Santa Isabel Association |
| 9 | Soils of the Humid Coastal Plains | | Soils of the Arid Coastal Plains |
| | Toa-Coloso-Reilly Association | | Melones-La Luna-Bahia Association |
| | Bajura-Joyuda-Catano Association | | Manglillo-Boqueron-Serrano Association |
| | Soils of the Semiarid Uplands | | |
| | Descalabrado-San German-Pozo Blanco Association | | |

GENERAL SOIL MAP
SAN GERMAN AREA, PUERTO RICO



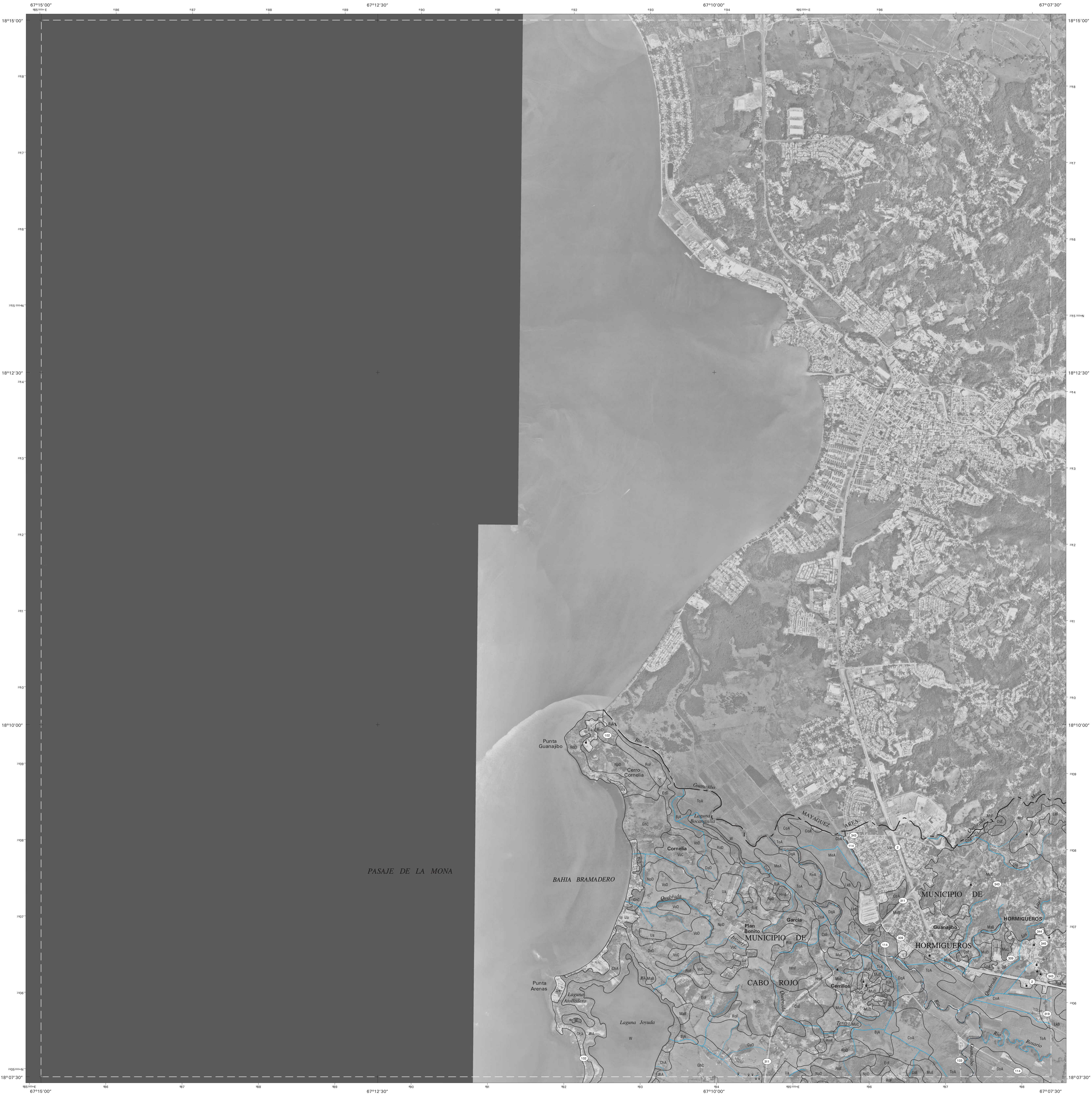
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Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

SOIL LEGEND

CONVENTIONAL AND SPECIAL
SYMBOLS LEGEND

SOIL LEGEND		CONVENTIONAL AND SPECIAL SYMBOLS LEGEND	
SYMBOL	NAME	SYMBOL	NAME
AbF	Agüeybaná clay, 20 to 60 percent slopes	LnC	Llanos Costa loam, 5 to 12 percent slopes
AgD	Aguilita silty clay loam, 5 to 20 percent slopes	LpG	Los Peñones-Limestone outcrop complex, 60 to 90 percent slopes
AgF	Aguilita silty clay loam, 20 to 60 percent slopes	MaB	Mabí clay, 2 to 5 percent slopes, rarely flooded
AkA	Aguirre clay, occasionally ponded	MbA	Maguayo very gravelly sandy clay loam, 0 to 2 percent slopes
AlF	Aljibe-Guamá-Indiera complex, 20 to 60 percent slopes	MbC	Maguayo very gravelly sandy clay loam, 2 to 12 percent slopes
AtD	Altamira gravelly clay, 2 to 20 percent slopes	McF	Malaya clay, 20 to 60 percent slopes
AtF	Altamira gravelly clay, 20 to 60 percent slopes	MDA	Manglillo, Boquerón, and Serrano soils, very frequently flooded
BaB	Bahía fine sand, 0 to 5 percent slopes	MeA	Maní clay, 0 to 2 percent slopes, occasionally flooded
BhB	Bahía Salinas sand, 0 to 5 percent slopes, rarely flooded	MfF	Maresúa gravelly clay loam, 20 to 60 percent slopes
BJA	Bajura clay, 0 to 1 percent slopes, frequently flooded	MgF	Maresúa-Serpentinite outcrop complex, 40 to 60 percent slopes
BkB	Beaches, sand, 0 to 5 percent slopes	MD	Mariana gravelly clay loam, 12 to 20 percent slopes
BmC	Bermeja-Cerro Mariquita complex, 5 to 12 percent slopes	ME	Mariana gravelly clay loam, 20 to 40 percent slopes
BmD	Bermeja-Cerro Mariquita complex, 12 to 20 percent slopes	MkF	Maricao clay, 20 to 60 percent slopes
BmF	Bermeja-Cerro Mariquita complex, 20 to 60 percent slopes	MkG	Maricao clay, 60 to 90 percent slopes
BrF	Bermeja-Rock outcrop complex, 20 to 60 percent slopes, extremely cobbly	MnA	Melones clay, 0 to 2 percent slopes
CaC	Cabo Rojo clay, 2 to 12 percent slopes	MnC	Melones clay, 2 to 12 percent slopes
ChD	Caguabo clay loam, 12 to 20 percent slopes	MoB	Montalva clay, 0 to 5 percent slopes
ChF	Caguabo clay loam, 20 to 60 percent slopes	MoC	Montalva clay, 5 to 12 percent slopes
CeA	Cartagena clay, 0 to 2 percent slopes	MqC	Montegrande clay, 2 to 12 percent slopes
CgD	Casabe clay, 5 to 20 percent slopes	MrD	Morado clay loam, 12 to 20 percent slopes
CgF	Casabe clay, 20 to 60 percent slopes	MrE	Morado clay loam, 20 to 40 percent slopes
ChA	Cataño sand, 0 to 2 percent slopes	MrF	Morado clay loam, 40 to 60 percent slopes
CJD	Cerro Gordo mucky peat, 2 to 20 percent slopes	MuC	Múcara loam, 5 to 12 percent slopes
CKD	Cerro Mariquita gravelly clay loam, 12 to 20 percent slopes	MuD	Múcara loam, 12 to 20 percent slopes
CKF	Cerro Mariquita gravelly clay loam, 20 to 60 percent slopes	MuE	Múcara loam, 20 to 40 percent slopes
CmB	Coamo clay loam, 2 to 5 percent slopes	MuF	Múcara loam, 40 to 60 percent slopes
CoA	Coloso clay, 0 to 2 percent slopes, occasionally flooded	NpD	Nipe clay, 5 to 20 percent slopes
CSE	Consumo clay, 20 to 40 percent slopes	OrA	Olivares muck, ponded
CsF	Consumo clay, 40 to 60 percent slopes	PaA	Palmarejo loam, 0 to 2 percent slopes
CtA	Cortada silty clay loam, 0 to 2 percent slopes, occasionally flooded	PaB	Palmarejo loam, 2 to 5 percent slopes
CuD	Costa-Pitahaya complex, 5 to 20 percent slopes	PaC	Palmarejo loam, 5 to 12 percent slopes
CuF	Costa-Pitahaya complex, 20 to 60 percent slopes	PgA	Parguera clay, 0 to 2 percent slopes
CvF	Cuchillas silty clay loam, 20 to 60 percent slopes	PgB	Parguera clay, 2 to 5 percent slopes
CvG	Cuchillas silty clay loam, 60 to 90 percent slopes	PsF	Pitahaya-Limestone outcrop-Seboruco complex, 40 to 60 percent slopes
DeD	Delicias clay, 5 to 20 percent slopes	PsG	Pitahaya-Limestone outcrop-Seboruco complex, 60 to 90 percent slopes
DqA	Dique loam, 0 to 2 percent slopes, frequently flooded	Pt	Pits and Quarries
DsC	Descalabrado clay, 2 to 12 percent slopes	PzB	Pozo Blanco clay, 0 to 5 percent slopes
DsD	Descalabrado clay, 12 to 20 percent slopes	PzC	Pozo Blanco clay, 5 to 12 percent slopes
DsF	Descalabrado clay, 20 to 60 percent slopes	PzD	Pozo Blanco clay, 12 to 20 percent slopes
EcD	El Cacique-La Taina complex, 5 to 20 percent slopes	QbD	Quebrada clay loam, 12 to 20 percent slopes
EcF	El Cacique-La Taina complex, 20 to 60 percent slopes	QbE	Quebrada clay loam, 20 to 40 percent slopes
EcG	El Cacique-La Taina complex, 60 to 90 percent slopes	QbF	Quebrada clay loam, 40 to 60 percent slopes
EdD	El Descanso-Hoconuco complex, 5 to 20 percent slopes	ReA	Reilly sandy loam, 0 to 2 percent slopes, frequently flooded
EdF	El Descanso-Hoconuco complex, 20 to 60 percent slopes	RoD	Rosario silty clay, 12 to 20 percent slopes
EdG	El Descanso-Hoconuco complex, 60 to 90 percent slopes	RoE	Rosario silty clay, 20 to 40 percent slopes
EpC	El Papayo gravelly clay loam, 2 to 12 percent slopes	RoF	Rosario silty clay, 40 to 60 percent slopes
EpD	El Papayo gravelly clay loam, 12 to 20 percent slopes	RuF	Rubias-Chiquito complex, 40 to 60 percent slopes
EpF	El Papayo gravelly clay loam, 20 to 60 percent slopes	RuG	Rubias-Chiquito complex, 60 to 90 percent slopes
FeA	Fé clay, 0 to 2 percent slopes	Sa	Salt flats, ponded
FrA	Fraternidad clay, 0 to 2 percent slopes	Sb	Salt pits
FrB	Fraternidad clay, 2 to 5 percent slopes	ScA	San Antón clay loam, 0 to 2 percent slopes, occasionally flooded
GbF	Guanábano clay, 20 to 60 percent slopes	SdD	San Germán cobbly clay loam, 5 to 20 percent slopes
GhC	Guanajibo gravelly sandy clay loam, 2 to 12 percent slopes	SdF	San Germán cobbly clay loam, 20 to 60 percent slopes
GnA	Guánica clay, 0 to 1 percent slopes	SgD	San Germán-Duey complex, 5 to 20 percent slopes
GuB	Guayabo fine sand, 0 to 5 percent slopes	SgF	San Germán-Duey complex, 20 to 60 percent slopes
GyB	Guayacán clay, 0 to 5 percent slopes	SiA	Santa Isabel clay, 0 to 2 percent slopes
GyC	Guayacán clay, 5 to 12 percent slopes	SmE	Santa Marta gravelly clay loam, 20 to 40 percent slopes
GyD	Guayacán clay, 12 to 20 percent slopes	SoC	Seboruco silty clay loam, 2 to 12 percent slopes
HmD	Humatas clay, 12 to 20 percent slopes	SsB	Sosa sandy loam, 2 to 5 percent slopes
HmE	Humatas clay, 20 to 40 percent slopes	SsC	Sosa sandy loam, 5 to 12 percent slopes
HmF	Humatas clay, 40 to 60 percent slopes	TeA	Teresa clay, 0 to 1 percent slopes
JaB	Jácana clay, 0 to 5 percent slopes	TfA	Teresa clay, ponded
JaC	Jácana clay, 5 to 12 percent slopes	ToA	Toa clay loam, 0 to 2 percent slopes, occasionally flooded
JBA	Joyuda, Atolladero, and Bajura soils, very frequently flooded	Ua	Urban land
LcE	La Covana-Limestone outcrop-Seboruco complex, 12 to 40 percent slopes	UbB	Urban land-Bahía complex, 0 to 5 percent slopes
LdA	La Luna silty clay loam, 0 to 2 percent slopes, occasionally flooded	UgB	Urban land-Guayabo complex, 0 to 5 percent slopes
LeF	La Tea-Limestone outcrop complex, 20 to 60 percent slopes	UsC	Urban land-Sosa complex, 5 to 12 percent slopes
LfC	Landfill, 0 to 8 percent slopes	VaA	Vayas silty clay, 0 to 2 percent slopes, occasionally flooded
LkB	Lares clay, 0 to 5 percent slopes	VoC	Voladora clay, 5 to 12 percent slopes
LnA	Llanos Costa loam, 0 to 2 percent slopes	VoD	Voladora clay, 12 to 20 percent slopes
LnB	Llanos Costa loam, 2 to 5 percent slopes	W	Water
		Wc	Waters of the Caribbean
CULTURAL FEATURES		SPECIAL SYMBOLS FOR SOIL SURVEY AND SSURGO	
BOUNDARIES	MISCELLANEOUS CULTURAL FEATURES	SOIL DELINEATIONS AND SYMBOLS	
National, state, or province	Farmstead, house	AbF	BmD
County or parish	Church	LANDFORM FEATURES	
Minor civil division	School	Bedrock escarpment	
Reservation (national forest or park, state forest or park)	Other religion	Other than bedrock escarpment	
Land grant	Located object	Short steep slope	
Limit of soil survey (label) and/or denied access area	Tank	Gully	
Field sheet matchline and neatline	Lookout tower	Depression, closed	
Previously published survey	Oil and/or natural gas wells	Sinkhole	
OTHER BOUNDARY	Windmill	Borrow pit	
Airport, airfield	Lighthouse	Gravel pit	
Cemetery		Mine or quarry	
City/county park		Landfill	
STATE COORDINATE TICK 1 890 000 FEET			
LAND DIVISION CORNER (section and land grants)			
GEOGRAPHIC COORDINATE TICK			
HYDROGRAPHIC FEATURES		MISCELLANEOUS SURFACE FEATURES	
TRANSPORTATION	STREAMS		
Divided roads	Perennial stream, double line	Blowout	
Other roads	Perennial stream, single line	Clay spot	
Trail	Intermittent stream	Gravelly spot	
	Drainage end	Lava spot	
ROAD EMBLEMS AND DESIGNATIONS	DRAINAGE AND IRRIGATION	Marsh or swamp	
Interstate	Double-line canal	Rock outcrop (includes sandstone and shale)	
Federal	Perennial drainage and/or irrigation ditch	Saline spot	
State	Intermittent drainage and/or irrigation ditch	Sandy spot	
County, farm or ranch		Severely eroded spot	
RAILROAD	SMALL LAKES, PONDS, AND RESERVOIRS	Slide or slip	
POWER TRANSMISSION LINE	Perennial water	Sodic spot	
PIPELINE	Miscellaneous water	Spoil area	
FENCE	Flood pool line	Stony spot	
LEVEES	MISCELLANEOUS WATER FEATURES	Very stony spot	
Without road	Spring	Wet spot	
With road	Well, artesian		
With railroad	Well, irrigation		
Single side slope			
DAMS			
Medium or small			
LANDFORM FEATURES			
Prominent hill or peak			



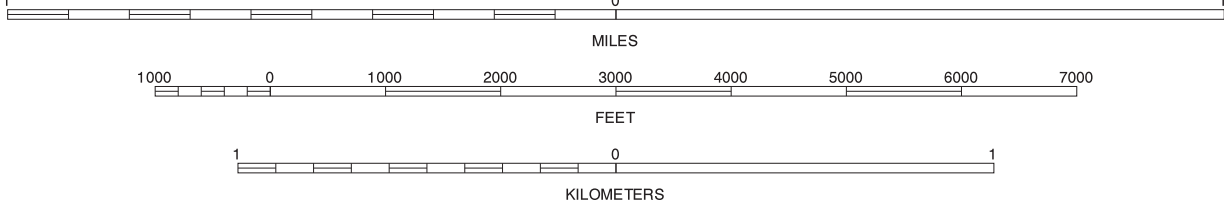
This soil survey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service. Base maps are orthophotographs prepared by the U.S. Department of Interior, Geological Survey, from 1950 aerial photography. Culture information was acquired from USGS topo maps and other sources. Hydro information was derived from USGS topo maps and orthophotography. Cultural features and hydro were edited to conform with features represented on the publication orthophotography and to enhance the clarity of the soils information.

North American Datum of 1983 (NAD83), GRS - 80 Spheroid 1000-meter ticks, Universal Transverse Mercator, zone 19. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

N
MAPS

QUADRANGLE LOCATION

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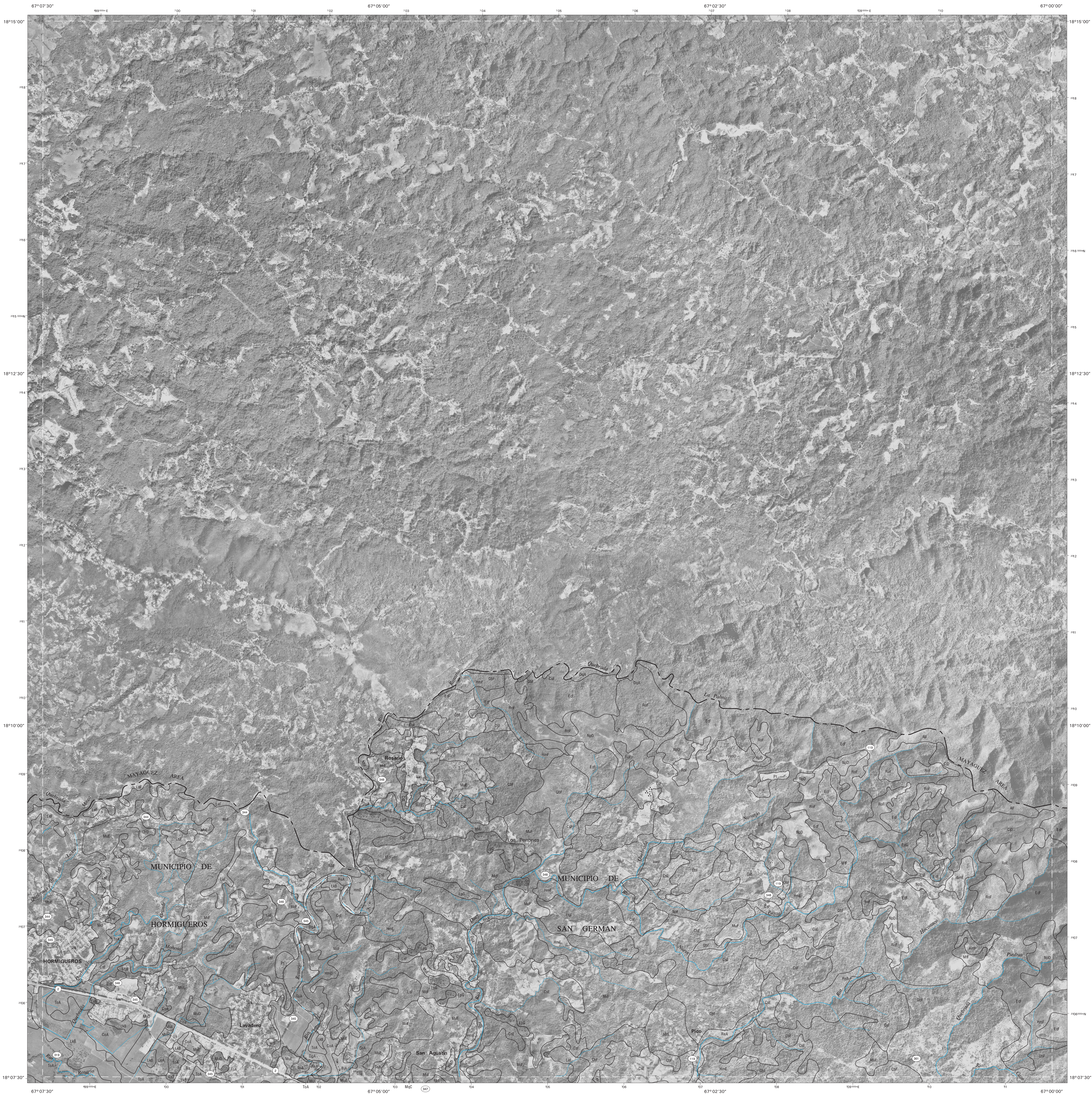


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MAYAGUEZ, PUERTO RICO
SHEET NUMBER 1 OF 12

Soil map delineations extending beyond the dashed white quadrangle neckline are for reference only and are included on adjacent map sheets.

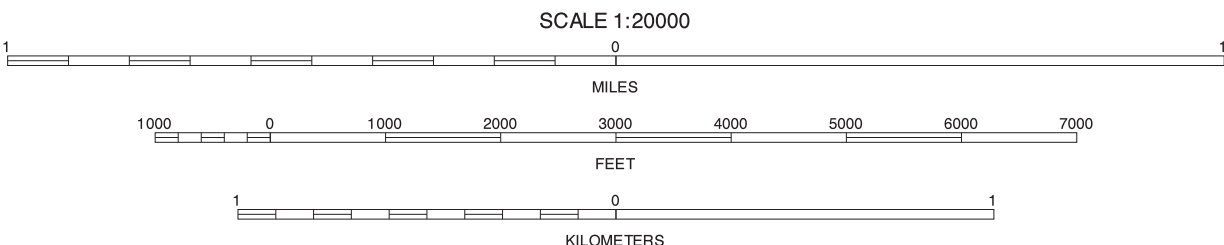


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North American Datum of 1983 (NAD83), GRS - 80 Spheroid
1000-meter UTM, Universal Transverse Mercator, Zone 19
Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

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METERS

QUADRANGLE LOCATION



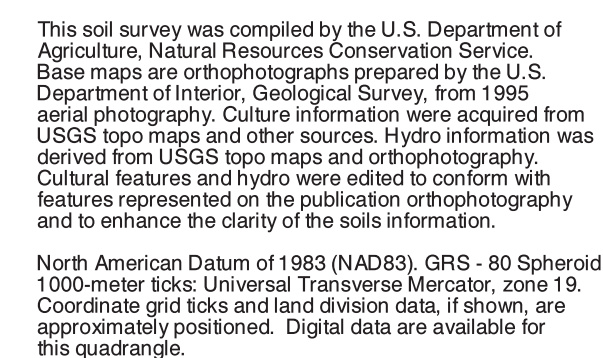
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ROSARIO, PUERTO RICO
SHEET NUMBER 2 OF 12

Soil map delineations extending beyond the dashed white quadrangle headings are for reference only and are included on adjacent map sheets.

SAN GERMAN, PUERTO RICO
MARICAO QUADRANGLE
SHEET NUMBER 3 OF 12



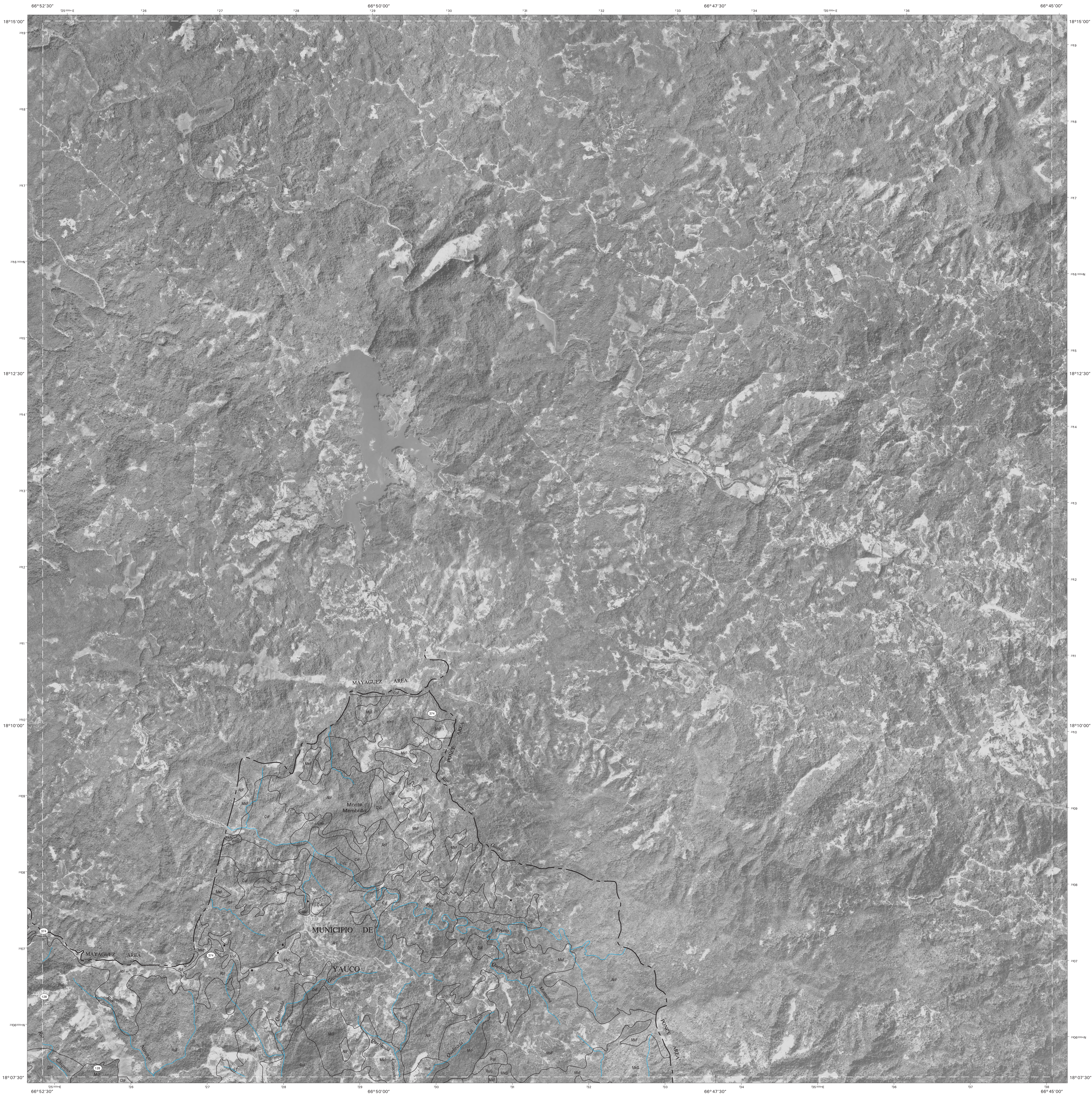
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6	7	8	

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- 2 ROSARIO
- 4 MONTE GUILARTE
- 6 SAN GERMAN
- 7 SABANA GRANDE
- 8 YAUCO

MARICAO, PUERTO RICO
SHEET NUMBER 3 OF 12

Soil map delineations extending beyond the dashed white quadrangle neatline are for reference only and are included on adjacent map sheets.

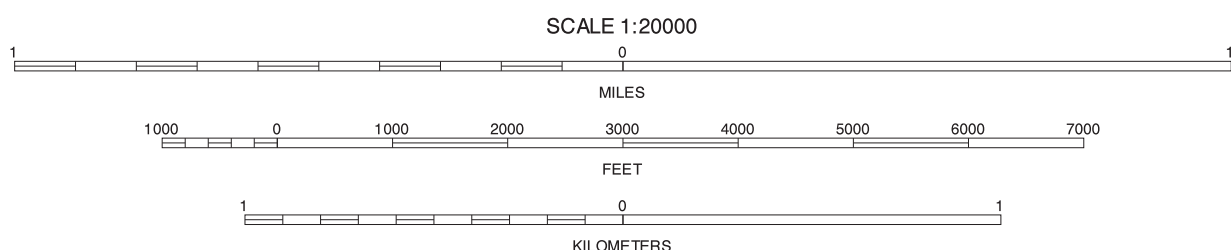


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North American Datum of 1983 (NAD83), GRS - 80 Spheroid 1000-meter UTM, Universal Transverse Mercator, Zone 19. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

QUADRANGLE LOCATION

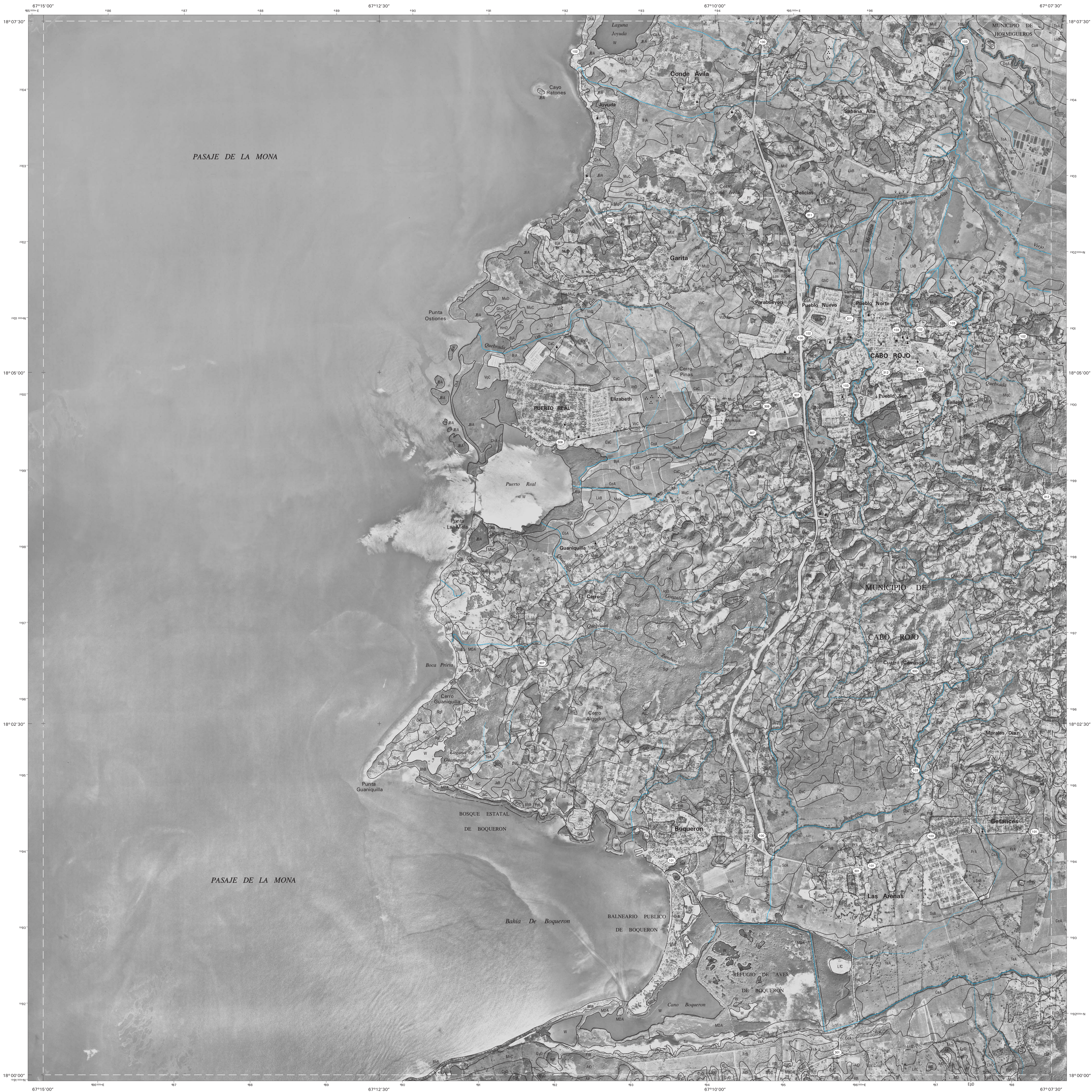


3		3
7	8	7

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MONTE GUILARTE, PUERTO RICO
SHEET NUMBER 4 OF 12

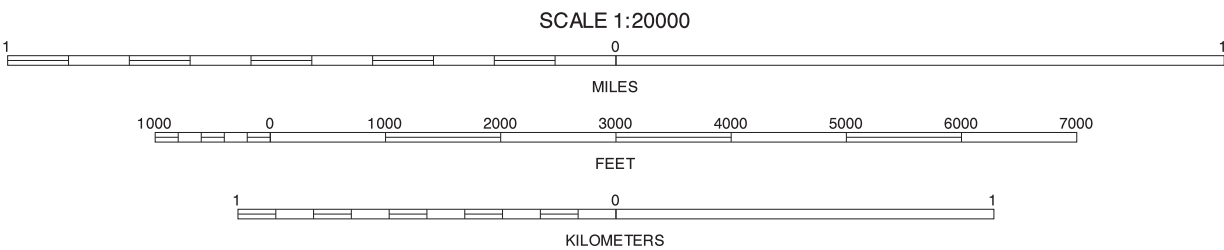
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North American Datum of 1983 (NAD83), GRS - 80 Spheroid
1000-meter ticks, Universal Transverse Mercator, Zone 19
Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

QUADRANGLE LOCATION

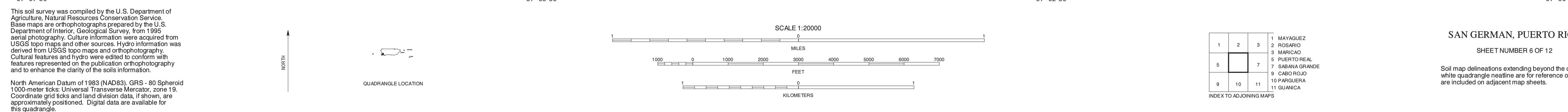


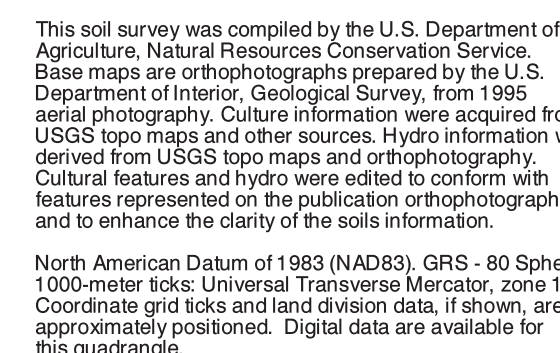
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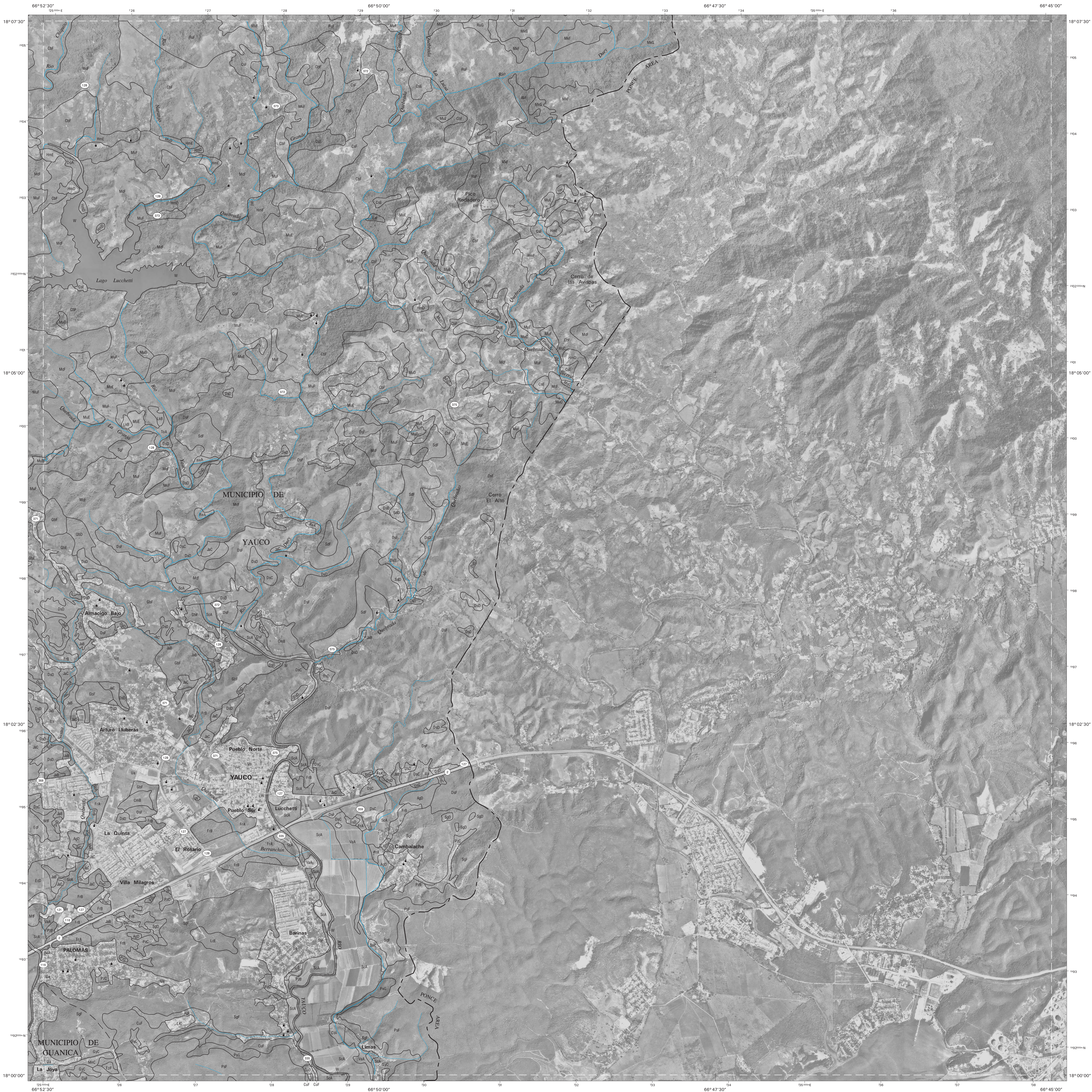
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PUERTO REAL, PUERTO RICO
SHEET NUMBER 5 OF 12

Soil map delineations extending beyond the dashed white quadrangle neckline are for reference only and are included on adjacent map sheets.





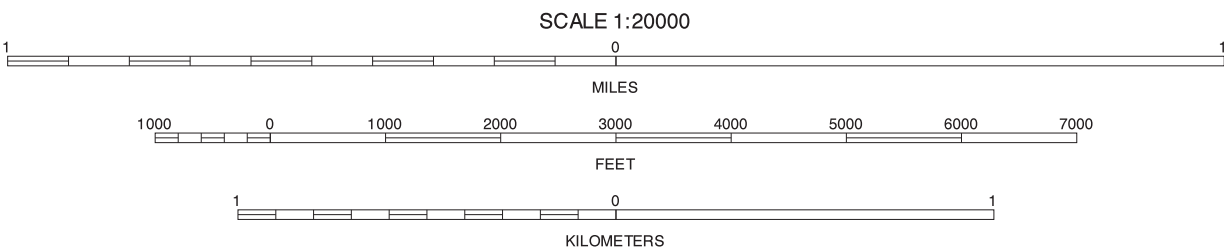


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North American Datum of 1983 (NAD83), GRS - 80 Spheroid
1000-meter UTM Universal Transverse Mercator, Zone 18
Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

NORTH

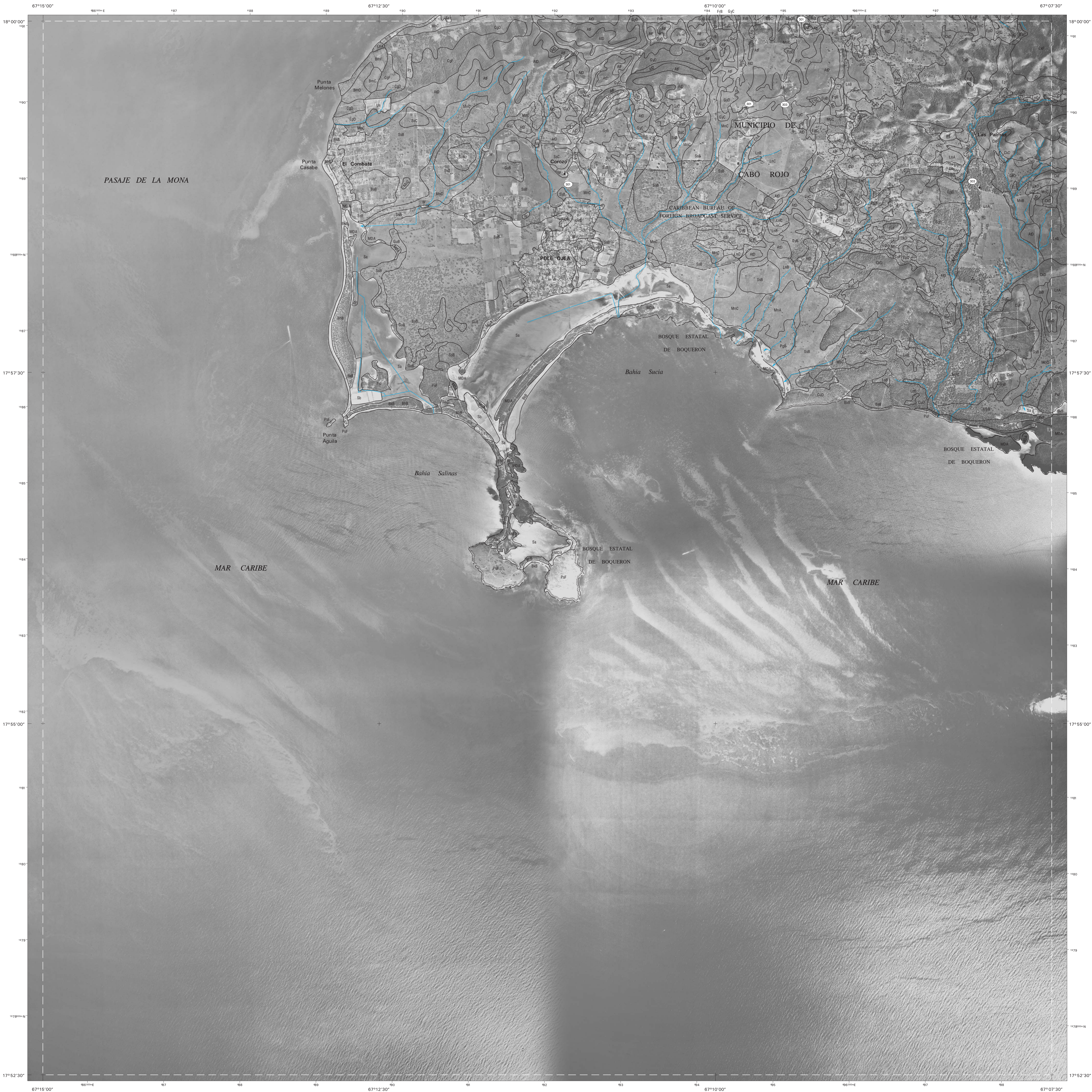
QUADRANGLE LOCATION



3	4	5	MARICAO
6	7	8	MONTE GILARTE
9	10	11	SABANA GRANDE
12	13	14	GUANICA
15	16	17	PUNTA VERRIACO

YAUCO, PUERTO RICO
SHEET NUMBER 8 OF 12

Soil map delineations extending beyond the dashed white quadrangle headline are for reference only and are included on adjacent map sheets.

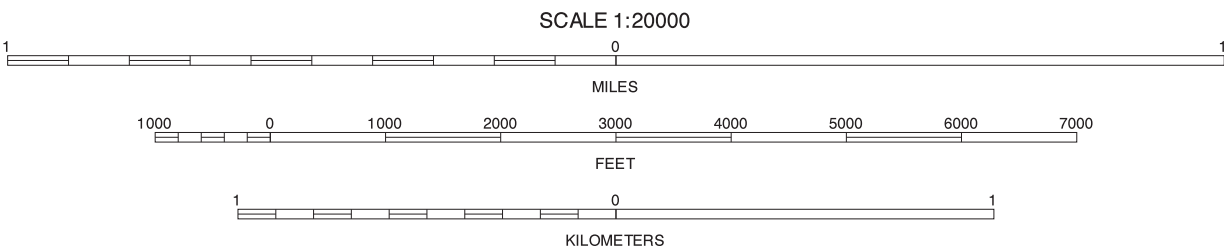


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North American Datum of 1983 (NAD83), GRS - 80 Spheroid 1000-meter ticks, Universal Transverse Mercator, zone 19. Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

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METERS

QUADRANGLE LOCATION

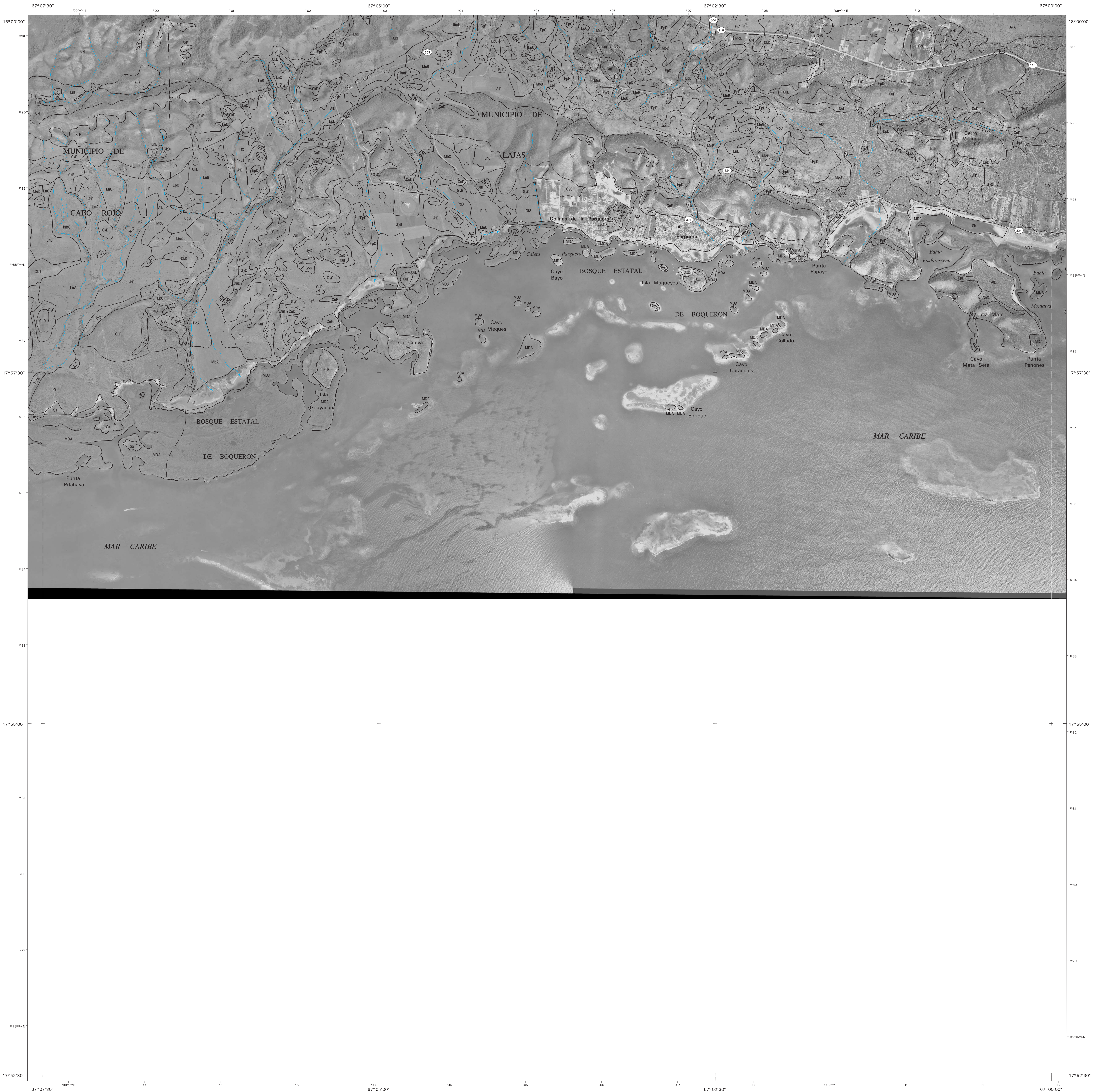


5	6	5 PUERTO RICO
10	10	5 SAN GERMAN
		10 PARGUERA

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CABO ROJO, PUERTO RICO
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Soil map delineations extending beyond the dashed white quadrangle headline are for reference only and are included on adjacent map sheets.

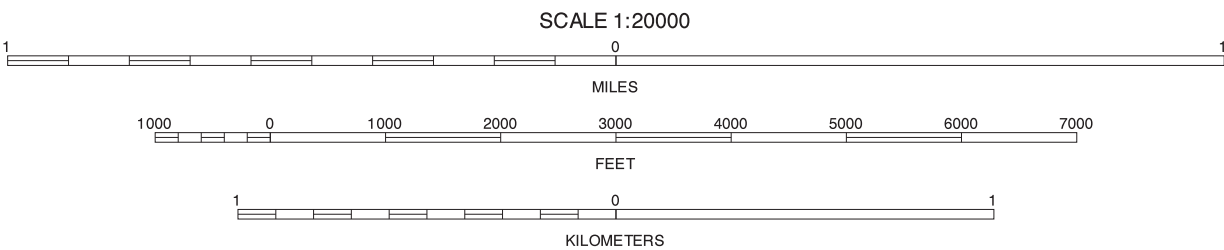


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North American Datum of 1983 (NAD83), GRS - 80 Spheroid
1000-meter ticks, Universal Transverse Mercator, zone 19.
Coordinate grid ticks and land division data, if shown, are approximately positioned. Digital data are available for this quadrangle.

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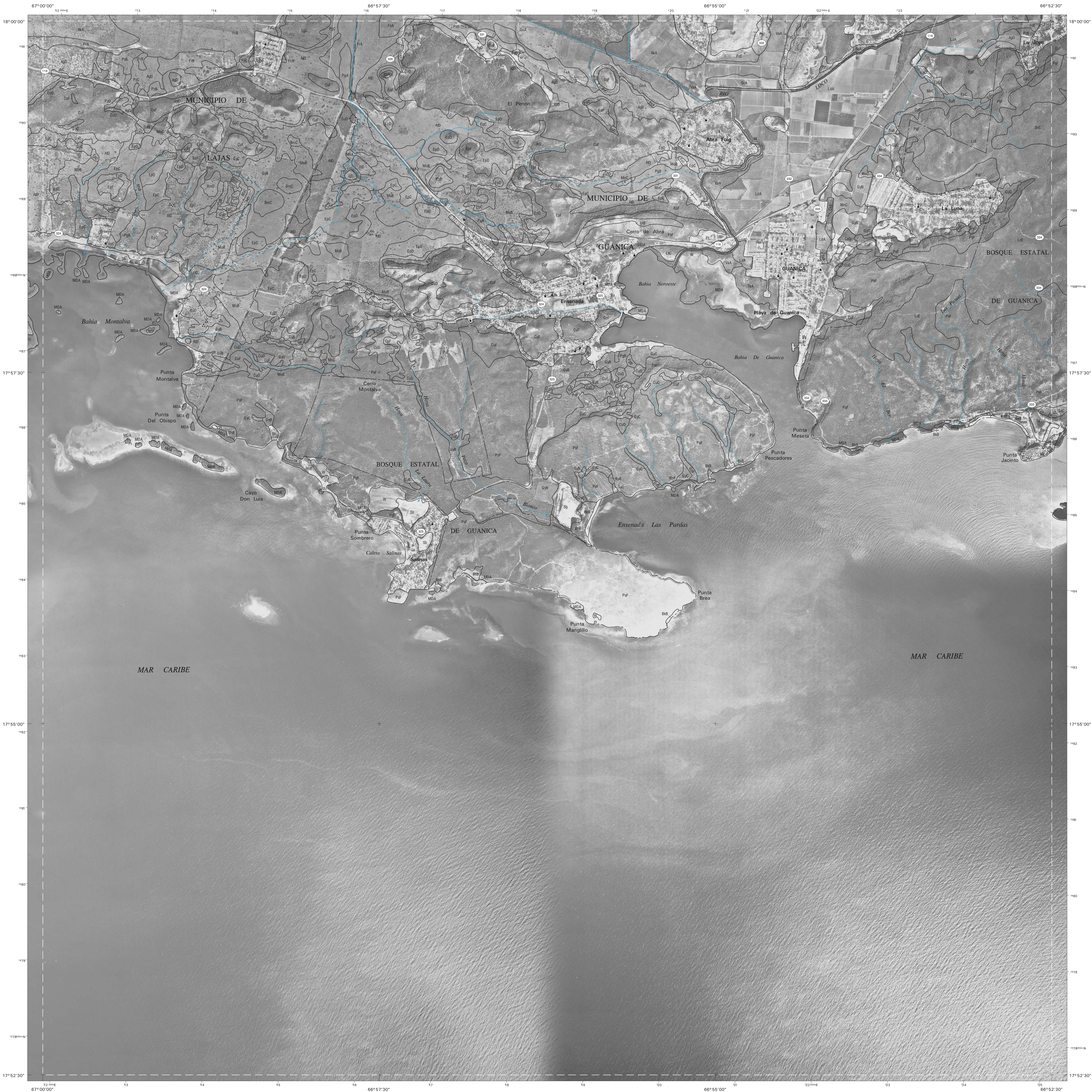
QUADRANGLE LOCATION



5	6	7	5 PUERTO REAL
6	7	8	6 SAN GERMAN
7	8	9	7 SAN JUAN GRANDE
8	9	10	8 CABO ROJO
9	10	11	9 GUAYAMA

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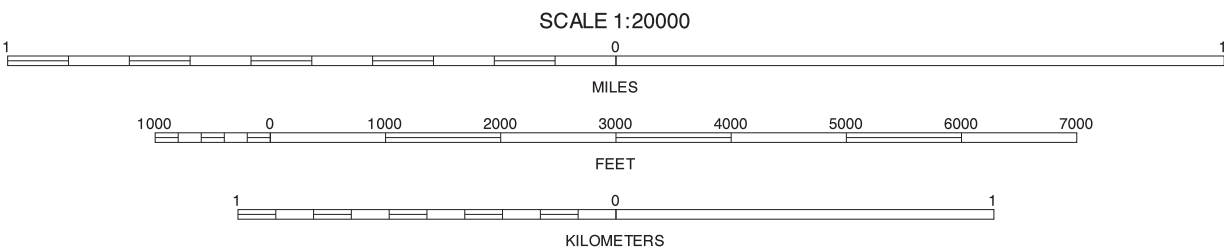


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NORTH

QUADRANGLE LOCATION



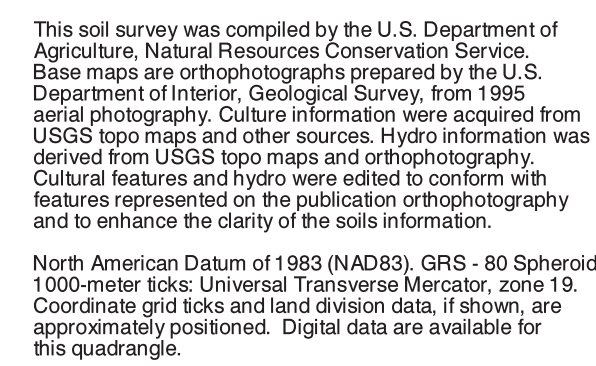
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GUANICA, PUERTO RICO
SHEET NUMBER 11 OF 12

Soil map delineations extending beyond the dashed white quadrangle neckline are for reference only and are included on adjacent map sheets.

SAN GERMAN, PUERTO RICO
PUNTA VERRACO QUADRANGLE
SHEET NUMBER 12 OF 12



SCALE 1:20000

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1000 0 1000 2000 3000 4000 5000 6000 7000

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1 0 1

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7	8	7 SABANA GRANDE
		8 YAUJO
11		11 GUANICA

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